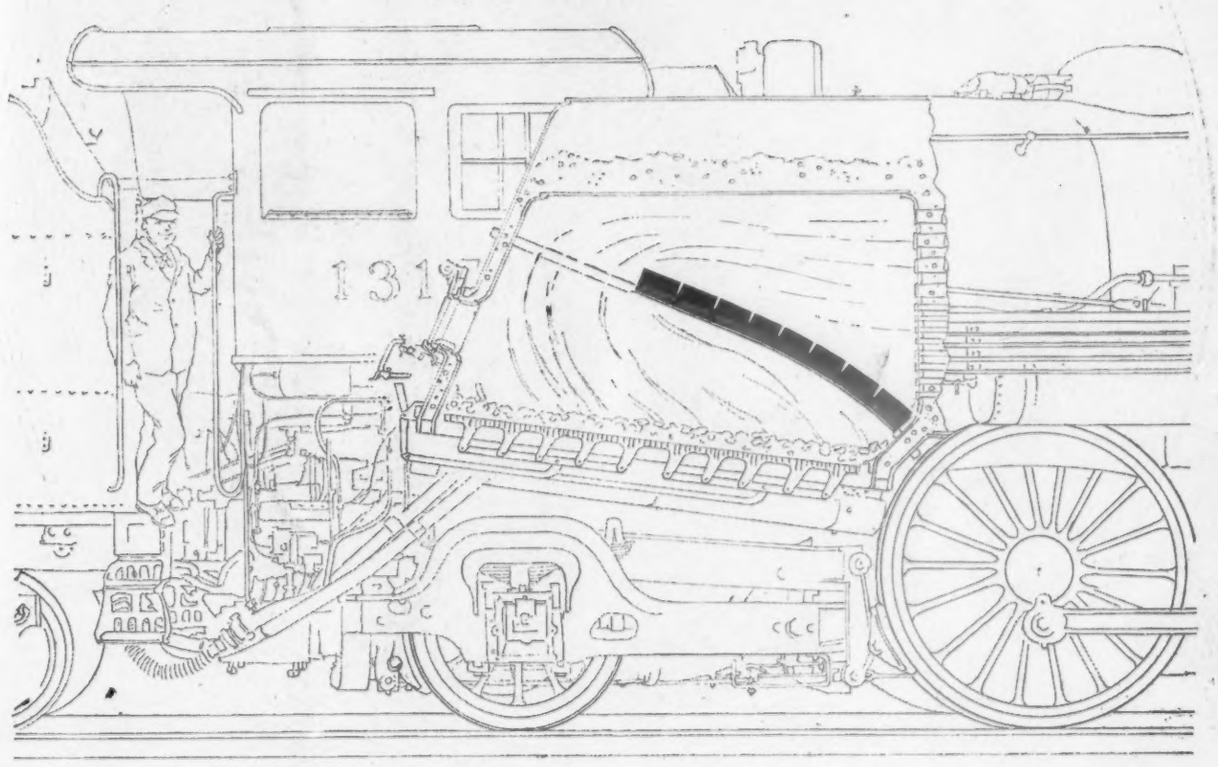
PERIODICAL ROOM
GENERAL LIBRARY
UNIV. OF MICH.

DEC 31 1923

Railway Age

SECOND HALF OF 1923—No. 26 NEW YORK—DECEMBER 29, 1923—CHICAGO SIXTY-EIGHTH YEAR



Nothing Takes the Place of An Arch

Ask for a copy of the new Bulletin that tells how Arches help.

EVEN with the most skillful handling by the engine crew, there's a coal loss on archless engines.

This loss varies according to the service and kind of locomotives.

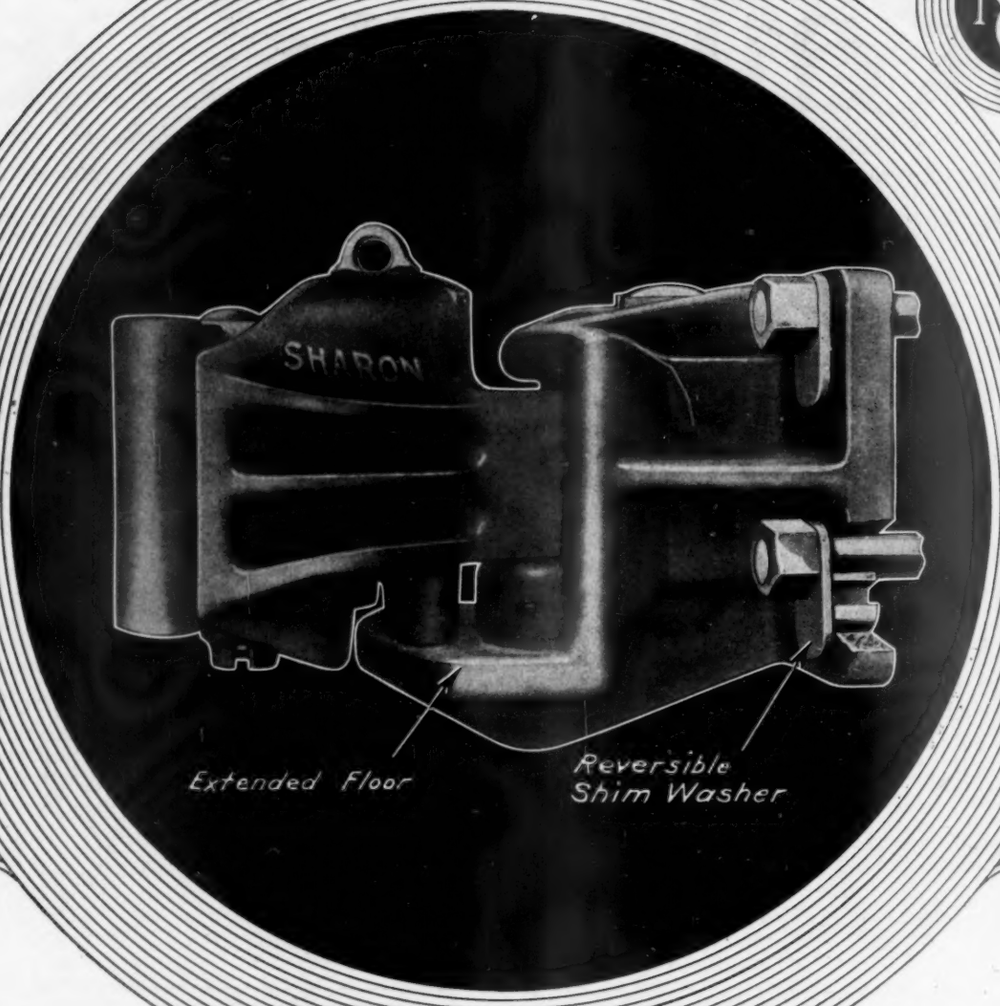
That's why the Arch is so important.

On light, hand-fired engines, working under most favorable conditions, an Arch saves over 10%.

On heavy, stoker engines, in slow freight service, the coal saving runs as high as 25%.

And you get this saving no matter what else you have on or put on that engine.

AMERICAN ARCH COMPANY, Inc.
NEW YORK CHICAGO



The NATIONAL
Extended Floor Engine Coupler Pocket

not only increases the efficiency of the Coupler but reduces the cost of coupler maintenance.

Support of the Coupler Head, forward of the mouth of the pocket, maintains the proper horizontal alignment of the coupler, and relieves the Coupler Shank and Pocket Pin of excessive strain.

THE NATIONAL MALLEABLE CASTINGS COMPANY

General Office — Cleveland, O.

Sales Offices: Cleveland, Chicago, Indianapolis, Toledo, Sharon, Pa., Melrose Park, Ill., East St. Louis, Ill., New York, Philadelphia, Washington, San Francisco, St. Louis, Detroit.

Works: Cleveland, Chicago, Indianapolis, Toledo, Sharon, Pa., Melrose Park, Ill., East St. Louis, Ill.

Volume 75 **Number 26**

Published Weekly by Simmons-Boardman Pub. Co., 30 Church St., New York, N. Y. Subscription Price U. S., Canada and Mexico, $6.00; foreign countries (excepting daily editions), $8.00, and $10.00 a year including all dailies; single copies, 25c. Entered as second-class matter January 30, 1918, at the post office at New York, N. Y., under the act of March 3, 1879.

EDITORIAL

Railway Age

The Table of Contents Will Be Found on Page 5 of the Advertising Section

Friendly Confidence in Every Employee

"It goes a great way toward making a man faithful to let him know that you think him so." The earliest expression of this truth in this language is attributed to Seneca, who departed this life nearly nineteen centuries ago. He was a Roman Stoic philosopher, but his apothegm is good today. It comes to mind on reading the Christmas greetings to employees which have been issued by W. J. Harahan, E. J. Pearson, Samuel Rea and other railroad presidents. Without exception, we find in these messages a genuine spirit of confidence, on the part of the managements, in the ability and devotion to duty of the employees. Any employee who is at all lacking in what is usually called loyalty must be ashamed to read a message of this kind—if he is possessed of even elementary honesty. But there are various kinds of minds among employees who do not seem to appreciate these friendly expressions; they cannot realize that the head of an army of many thousands can get close to the private soldier, even in thought. What can be done with these? Dr. Charles A. Eaton, in his Y. M. C. A. address at St. Louis, said that the cure for the real or supposed evils of capitalism would be more capitalists. A similar rule would apply here. A message of thanks which is not fully appreciated by all to whom it is addressed should be repeated; or perhaps should be uttered in some other way. The railroad president who desires to impart the highest effectiveness to his message—his all-the-year-round message—of good will, has the problem of making all of his trainmasters, foremen, head clerks and other subordinates as intelligently benevolent as himself. Or, rather, as capable as himself in expressing the idea. They feel it already, it is to be assumed. The art of right expression may well be a subject of intensified study at this time.

New Expenses Classification

The *Railway Age* reproduces in another part of this issue a summary of the important changes to be found in the tentative revision of the operating expenses classification. The summary in question was prepared by Alexander Wylie and appears as an introduction in the mimeograph copy of the tentative classification now made available by the I. C. C. Bureau of Accounts, of which he is the director. Work on the revision of the operating expenses classification has been under way for considerably more than a year. The Bureau of Accounts has been assisted by a committee of the Railway Accounting Officers' Association for the co-operation of which Mr. Wylie makes graceful acknowledgment. The classification as thus far prepared is "very" tentative. It is offered by the Bureau in its present form to bring out suggestions and criticisms. The distinguishing feature of the new classification is adherence to departmental accounting. It offers no particularly radical change in railway accounting methods. It is, generally speaking, rather an attempt to revise the present classification in the light of the ten years' experience the railways have had with it so as to make it more useful for its intended purpose and also to remove certain inconsistencies of refinement or rule-of-thumb allocation of values. Mr. Wylie has asked for criticism. This may come from those who will not be convinced that the new classification will sufficiently assist the commission in its new responsibilities of determining efficiency and economy of operation, and who would like to see something done in the way of cost accounting. A revision of this kind is a thing of magnitude and is not the sort of a job in connection with which those who do the work and upon whom devolves the duty of putting it into effect would feel impelled to depart far from accepted practice. This situation, perforce, makes difficult the criticism of those whom we shall term the cost accounting advocates. They will have to present suggestions of a very constructive order, and they will be compelled to offer a plan for which they can guarantee results without undue cost that may defeat its own purpose.

A New Year's Thought on Engine Terminals

An editorial in last week's issue explained briefly how engine terminals, as at present equipped, limit railroad net operating income. Proper facilities for inspection, making minor repairs, washing boilers, machining locomotive parts and other operations are in many cases notable by their absence. Coal and ashes cannot be handled except at excessive labor cost and delay to locomotives. Moreover, too many engine terminals are accurately described as "dark, dirty, noisy holes," and the problem of getting efficient personnel effort in such places is practically insurmountable. Whatever reasons for present terminal conditions have existed in the past the conditions themselves must be altered before railroads can achieve the degree of efficient operation which is their goal. One prominent consulting engineer who has made practically a life study of locomotive design and operation feels that the trouble with engine terminals is in the attitude of both mechanical and operating officers toward them. This engineer recently made the following significant suggestion which may well be adopted as a New Year's resolution by all railroad officers having any connection whatever with engine terminal design, equipment, or operation: "Terminal means *ending*. Make it mean *beginning* in the case of engine terminals and we can go ahead."

An Educational Opportunity In New York

There are many places in this country where a railroad man may secure training in the technique of some particular job, while still remaining in the service. If he is fortunate enough to live in a large city he can study almost any trade or law or engineering at night school. On the other hand, however, instruction in the broader aspects of railroading—the labor problem, railway economics, railway finance—and the technical branches which belong peculiarly to the railroad, such as railway operation, railway accounting, railway statistics, etc., can rarely be obtained elsewhere than at a regular university requiring attendance throughout the day, and is, consequently, beyond the reach of the ambitious railroad man who has to stay at his job while he studies. Probably the only way that this situation can be remedied is for railroad

men to prove to those in charge of educational institutions which offer courses in the evening that there is a demand for instruction in the broader aspects of their work. An opportunity to give this proof is afforded right now to railroad men in the vicinity of New York. Dr. David Friday, the research director of the National Transportation Institute and doubtless one of the ablest economists in the country, will give a course beginning January 3 at the New School for Social Research, 465 West Twenty-third street, New York, on the effect of railway rates and taxation on the prices of commodities in general. The radical agitation to the effect that high freight rates are ruining the farmer and damaging other business makes the subject matter of this course of particular interest to railroad men at the present time, in addition to the fact that it is one of the most interesting and important phases of railway economics. Dr. Friday's class in this subject will meet for an hour and a half on Thursday of each week at 5:20 p. m. The course lasts 12 weeks, and the tuition fee is moderate—only $15. No text books are required. The New School for Social Research exists only for adult education. It assumes that all its students come to it to learn. Consequently, there are no examinations and no compulsory assignments; no attendance records are taken and no degrees are conferred. Classes are conducted as informal lectures, which students may interrupt at any time to ask for further explanation or for discussion. In short, there is no petty, academic discipline which would be distasteful to a man of affairs. No requirements of previous high school or college training are made. In sum, here is an opportunity for New York railroad men with active minds, regardless of their years or rank, to acquire interesting and valuable information and to join in discussing with able leadership some of the broader aspects of their business.

More "Safety First" Needed

THERE ARE OMINOUS SIGNS that many railway managements need to increase and intensify "safety first" work among their employees.

It is known to all persons who have thoroughly studied the facts that a very large majority of all kinds of accidents on railways are due to failures of the human element in operation. If the plant of every railway should be made as perfect as the utmost ingenuity of the human brain and the investment of capital could make it at least three-fourths of all those who are injured and killed in railway accidents would continue to be injured and killed unless officers and employees should constantly bear in mind that safety should always be given first and paramount consideration.

Great improvements in the physical plants were made throughout the history of the railways up to the year 1907. In that year, however, the record of fatalities was the worst in history, and it continued to be relatively bad for some years afterward. Railway officers recognized the fact that no substantial improvement in the situation could be made as long as so many employees continued to take careless and reckless chances affecting their own safety and that of passengers. In 1910 there was begun and rapidly spread over the railways the "Safety First" movement. It is not necessary to tell readers of the *Railway Age* the nature of this movement or the methods used. It consisted primarily in bringing about organized co-operation between the officers and employees of every road to reduce accidents. It brought home to all officers and employees the imperative need for each and every one of them, in the interests of his railway and himself, to avoid doing the innumerable things that resulted in accidents.

This movement and its results constituted one of the most remarkable and satisfactory chapters in the history of railway operation in the United States. It caused a steady and rapid reduction of fatalities to all classes of railway employees and patrons. It made it possible to record the fact that in 1921 there was made the best railway accident record in history. In that year the total number of persons killed on the railroads was only about the same as in 1889, although there had been an increase of 140 per cent in the number of employees, of 225 per cent in passenger business and of 400 per cent in freight business. The record of 1922 was almost as good as that of 1921.

The record of 1923 will be much less satisfactory. There has been a large increase in the number of employees and in the traffic handled, but it has not been sufficient to explain, much less justify, the increase in accidents. Unfortunately, the Interstate Commerce Commission does not compile and publish complete statistics of accidents as promptly as statistics regarding other matters. As far as accident statistics are available, however, they throw light on what the year's record may be expected to show. In the first six months of 1922 the number of non-trespassers killed in train and train service accidents, excluding persons killed at highway grade crossings, was 773, while in the first six months of 1923 it was 1,003, an increase of about 30 per cent. The increase in the number of employees on duty killed was from 511 to 714. The record of the second half of the year 1923 probably will not show any improvement.

The record now being made is still much better than that of 10 years ago, but it is getting worse, whereas it should continue to improve. Ten years ago railway accidents were constantly being "played up" in the press, and they were one of the principal causes of anti-railway sentiment and agitation. For some years the accident record of the railways has been so good that it has attracted little attention from the press and public. It is as notable as ominous that recently railway accidents have been receiving increased prominence in the press and that old-fashioned proposals that, in the interest of safety, officers and directors be required to ride on the locomotive cow-catchers are beginning to reappear.

It behooves the officers of every railway in the country to begin to give increased attention to safety work among employees. The safety officers should be given more support by the executives. There is needed a great revival of the "Safety First" movement. It should not be delayed until a really bad accident record is being or already has been made.

Coal Shipments and the Prospective Miners' Strike

PRACTICALLY EVERY PERSON familiar with the conditions existing in the bituminous coal mining industry believes there will be a strike of miners in the union mines on April 1, 1924. Governor Pinchot of Pennsylvania awarded an advance in wages to settle the anthracite strike this year. The bituminous miners, this precedent having been set, are demanding an advance in their wages, although they are still on the basis fixed in 1920, which was the highest ever established. The bituminous mine operators are demanding a reduction of wages. The large production of coal this year and the open winter and other conditions have caused a reduction in the latter part of the year in the price of coal which is making it impossible for many mines to operate at a profit.

Coal constitutes about one-third of the tonnage handled by the railroads and a much larger part of the tonnage of

many roads. The mere prospect of a coal strike renders it necessary for many roads whose traffic consists largely of coal to begin to retrench. A strike itself greatly reduces their traffic and has a demoralizing effect upon railway operation, both while the strike lasts and after it is ended.

Because the prospect of a coal strike is so strong and for other reasons it is pertinent and important to review at this time what has occurred in the year now drawing to a close with respect to the production and transportation of coal, and what is occurring now. Repeatedly within recent years the country has been menaced with coal shortages. On almost every such occasion the railways have been denounced as largely or wholly responsible for the situation.

The course of events during 1923 has demonstrated beyond any question that the railways now have sufficient capacity to transport satisfactorily all the coal the country requires for industrial and domestic purposes, and that if the nation in the near future is menaced with a coal shortage it will be due to conditions for which the railways are not in any way responsible. It will be due to labor troubles or to failure of consumers to buy coal when an ample supply is available.

In the early part of the present year the railways were still engaged in making great efforts to move enough coal to remedy the aftermath of the coal strike of 1922. They succeeded in handling enough of it to supply and even more than supply all needs. Up to the end of October there had been produced, and the railways had transported, almost 457,000,000 tons of bituminous coal. This surpassed the record made in the first 10 months of any previous year except 1918. All previous records of the railways in moving coal would have been broken if the coal offered them for movement had been sufficient to enable them to do so.

In previous years there usually has been a substantial increase in the production and transportation of coal in the fall and early winter months. This year instead of an increase there has been a decline. The decline has been due entirely to a decline in the amount of coal offered to the railways for movement. That freight business has been relatively less in the last quarter of the year than earlier in the year and has been mainly due to the fact that coal shipments have declined when they usually have increased.

What has occurred since the week ended November 3, up to which time the total coal tonnage handled exceeded that in the corresponding part of any preceding year except 1918, is indicated by the fact that in the seven weeks ended December 15 the amount of coal shipments loaded averaged only 9,966,000 tons a week. In the corresponding period of 1922 they averaged 11,811,000 tons a week, and in the corresponding period of 1920, 12,130,000 tons a week. This is a decline as compared with 1922 of over 15 per cent, and as compared with 1920 of almost 18 per cent. As a result of this decline the total tonnage of coal transported in 1923 will be less than in either 1917, 1918 or 1920.

As the year draws to a close the amount of coal being produced and shipped continues to be about these percentages less than in 1922 and 1920. The weather is still mild, and there is an unusual amount of coal in storage. As already said, however, almost every well-informed person believes there will be a bituminous strike on April 1. If shipments of coal continue to be so small will the supplies now in storage be maintained? If the production and shipment of coal continue to be so small will the country be prepared for a coal strike on April 1?

The railways have shown that from week to week, if they are given a chance, they can transport all the coal required. If, however, before a coal strike they are not given opportunity to move even a normal amount of coal, and if, owing to a coal strike, they are denied opportunity for weeks or months at a time to move a normal amount of it, the nation cannot blame them if it gets short of fuel.

Now is the time to begin to prepare for a coal strike on April 1. The best way to prepare for it will be for producers and consumers to give the railways a chance within the next three months to move a normal, or more than normal, amount of coal. They are not doing this now.

Books and Special Articles of Interest to Railroaders

(Compiled by Elizabeth Cullen, Reference Librarian, Bureau of Railway Economics, Washington, D. C.)

Books and Pamphlets

Industrial Organization; Developments and Prospects, by John Lee. Various plans for employees' representation in management in Britain and the United States, with a section on "Legislation or Evolution." 121 p. Published by Sir I. Pitman & Sons, Ltd., London and New York.

Labor and Capital on the Railways. Prepared by the Labor Research Dept. A discussion from the point of view of British labor. "Studies in Labor and Capital, Vol. 4." 64 p. Published by the Labor Publishing Company, London, England.

The Pre-War Business Cycle, 1907 *to* 1914, by William Charles Schluter. Studies in History, Economics and Public Law, Columbia University, Vol. 108, No. 1, whole No. 243. Railroads in the business cycle. Published by Columbia University, New York.

Railroad Valuation; A Statement of the Problem, by Leslie Craven. Pamphlet form of an address previously printed in the *Railway Age.* 37 p. Publisher not given, but probably obtainable from American Bar Association, Chicago, or the author.

Railway Amalgamation in Great Britain, by W. E. Simnet. A survey. 276 p. Published by Railway Gazette, London.

Recapture Clause Case, Oral Argument, by James M. Beck. In the Supreme Court of the United States. 29 p. Published by Government Printing Office, Washington, D. C.

Periodical Articles

Government Ownership and Operation—a World-Wide Delusion and Its Failure Under Test. by William Peter Hamilton. An historical summary. Barron's, December 17, 1923, p. 5.

Graphical Determination of Running of Trains, by Ctibor Fiala. Bulletin of the International Railway Congress Association, English Edition, December, 1923, p. 1081-1086. Published by the Association.

How We Brought Management and Worker Together, by W. W. Atterbury. Includes table, p. 44, "How Management Functions Are Distributed Under 80 Employee Representation Plans." System, January, 1924, p. 42-45.

The New Tepic Railway. Southern Pacific of Mexico's new line between Tepic and La Quemada. Bulletin of the Pan American Union, January, 1924, p. 19-21.

On the Trans-Siberian Express, I, II, by Arnaldo Cipolla. Railroad conditions in Siberia at the present time. Living Age, December 8, 15, 1923, p. 458-469, 507-509.

Snapshots of the Bulgarian Insurrection, by Dr. Dimo Siaroff. Chiefly descriptions of different uses of the railway system made by insurrectionists and government forces. Living Age, December 15, 1923, p. 500-504.

Letters to the Editor

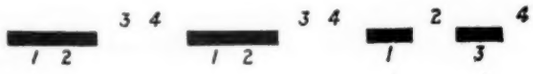
[*The* RAILWAY AGE *welcomes letters from its readers and especially those containing constructive suggestions for improvements in the railway field. Short letters—about* 250 *words—are particularly appreciated. The editors do not hold themselves responsible for facts or opinions expressed.*]

Careful Whistling—Plan No. 2

BANGOR, Maine

TO THE EDITOR:

Referring to the editorial in your issue of December 8 on whistling at crossings in which you ask, "What superintendent will start a campaign among his enginemen to get his division marked 100 per cent for correct whistling?" the two superintendents on the Bangor & Aroostook started such a campaign last September. The plan adopted was to regulate the length of the whistle blasts and the spaces by counting, as, for example, in music. A chart was furnished like this:

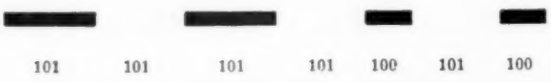


The long lines represent the long blasts and the short ones the short blasts. The numbers below the line represent the numbers to be counted when the lever is pulled down, and the numbers above the line those to be counted when the lever is up.

A great improvement in the manner of sounding the crossing whistle signal was immediately apparent; and while the result might not perhaps be classed as 100 per cent, we feel confident that for uniformity, correct spacing, and proper duration of blasts, the performance here is surpassed nowhere; and is equalled on few, if any, roads.

W. K. HALLETT,
General Manager, Bangor & Aroostook.

[The letter from William Elmer, published in the *Railway Age* of December 22, page 1144, described the methods by which correct whistling is learned on the Middle division of the Pennsylvania, one method being to pronounce the words "one hundred and one" to measure a second, and to pronounce "one hundred" to measure a half second. In the diagram at the bottom of the letter these time measurements were not correctly stated. They are as shown below:



In measuring without the aid of a buzzer, Mr. Elmer depends upon the normal time, or assumed normal time, which is required to pronounce the four words "one hundred and one" (five syllables). Mr. Hallett's scheme is more like teaching music; the learner must use his judgment (after having his judgment educated, by rule or example) to decide how rapidly he will enunciate two syllables (one, two) to occupy as much time as the Pennsylvania scheme takes to pronounce five syllables. It will be noted that under the Bangor & Aroostook rule the third interval is one-half second, instead of one second, as in Pennsylvania practice. If it is desired to use more than 5½ seconds in making the four blasts, the learner on the B. & A. must practise counting more slowly.—EDITOR.]

Interlocked Highway Crossings

PITTSBURGH, Pa.

TO THE EDITOR:

I note with interest, suggestions contained in a letter to the editor, signed A. R. P., in the November 17 issue of the *Railway Age*, concerning a crossing gate which is to be swung either across the highway at a grade crossing with a railway line, or across the railway, reference being made to similar installations in England. Conditions in England differ radically from those in the United States. The rights-of-way are carefully guarded, and the men who serve as crossing flagmen or watchmen have also been trained in the handling of railway traffic. Some objections to following the practice mentioned in this country are:

(1) Men controlling train movements are generally of higher intelligence than those used for flagging grade crossings. The latter are taken largely from track forces, and the knowledge of the individuals is limited in most cases to keeping themselves and others away from the track when trains are approaching. They are not experienced in determining whether trains shall stop except under emergency conditions.

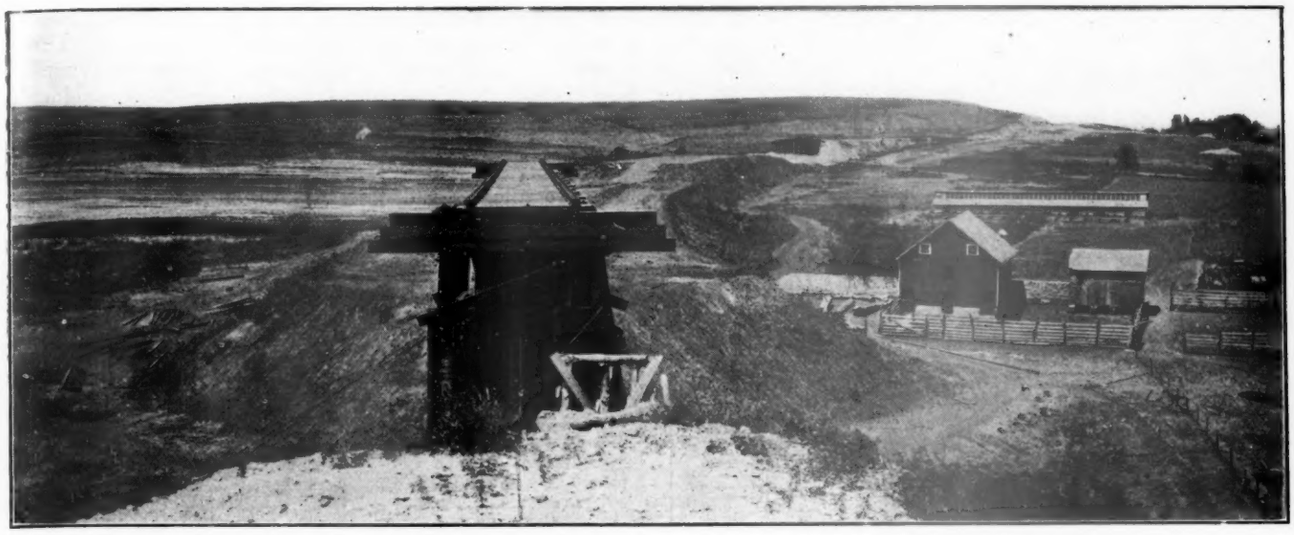
(2) The handling of the crossing gate determined by a one-half mile approach section on the railway will not work out satisfactorily, as a safe handling of the gate will require a home signal at the crossing, with a caution indication from a distant signal available one mile therefrom. To provide approach locking to make the installation safe for passenger trains and to avoid delay, the route must be lined up as soon as the train enters the track circuit approaching the distant signal, or approximately two miles from the crossing.

(3) Freight trains, being slower than passenger trains, will tie up the crossing unduly on account of the necessity of their operating under the same restrictions as in (2).

The best means now offered for making grade crossings safe is in the 24-hour service being given at hundreds of grade crossings by audible and visual warning signals. Requisites for these devices of both the wig-wag and flashing light type have been prepared by a committee of the Signal section of the American Railway Association. The number in successful operation, in many cases having replaced watchmen at important crossings, testify as to their merit. With the increasing cost of labor and the desire for 24-hr. protection, the automatic flagman offers a better means than that used in England, or what has been done up to the present time in the United States. S. E. J.

Kadel & Herbert

President A. H. Smith in the Cab of New York Central No. 999 on Occasion of Service-Progress Special's Sojourn in New York City



The Crocker Creek Bridge and Fill

Santa Fe Builds 49-Mile Cut-off In Kansas

Ellinor-Eldorado Line Will Effect Large Economies in Freight Movements West and Southwest

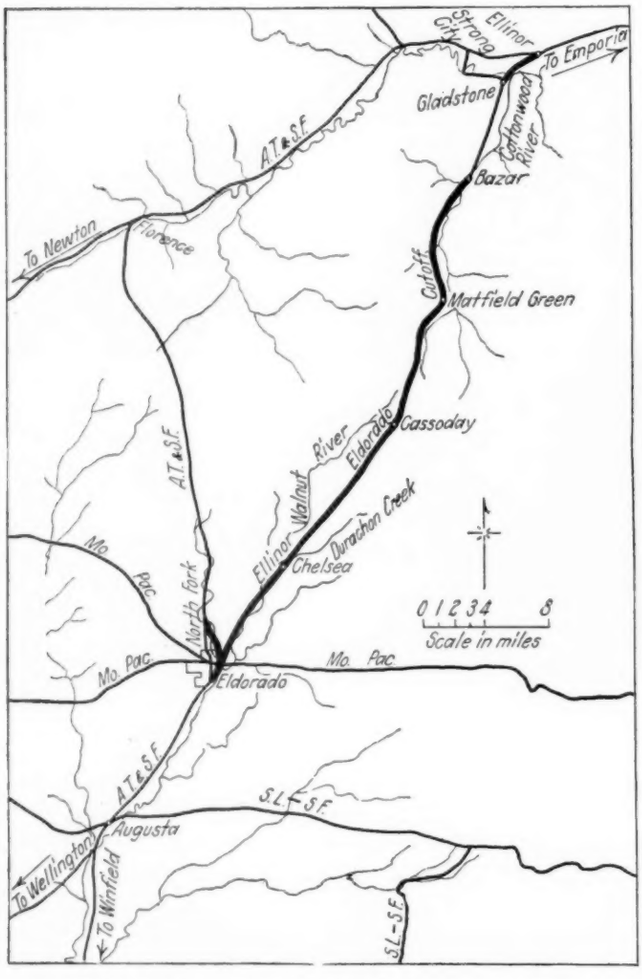
THE ATCHISON, TOPEKA & SANTA FE is now completing a 49-mile line in southern Kansas, known as the Eldorado cut-off, at a cost of over $4,000,000, for the purpose of securing greater economy and expedition in the handling of its freight traffic between Kansas City and the Pacific coast and the Gulf of Mexico. On the basis of an assumed annual movement of 12,000,000 tons over this line, it is estimated that economies aggregating $280,000 annually will be effected, as a consequence of a saving of 13.85 miles in distance and the reduction of the ruling grade from 0.6 per cent to 0.4 per cent. Another important consideration which influenced the decision to construct this cut-off is the relief it will afford the Santa Fe's main line between Emporia, Kan., and Florence, which is the "neck of the bottle" of the eastern lines of that system.

From Emporia east, two routes lead to Kansas City, namely, a double track line via Ottawa Junction, over which the freight is moved, and a single track line by way of Topeka which carries most of the passenger traffic. All of the traffic of both of these lines must move over the single route for 45 miles between Emporia and Florence. At the latter point freight traffic for points south and for points west of Albuquerque, N. M., and the gulf, diverges to the south by way of Augusta, that for the far west again diverging west at the latter point and passing through Wellington and the Panhandle of Texas, while that for southern points passes through Winfield and Arkansas City. Freight for western Kansas and all passenger traffic moves west from Florence on the main line to Newton, 28 miles west of Florence, where the passenger trains for the south diverge for Wichita, Mulvane and Winfield.

The traffic between Emporia and Florence amounts to

A Number of Trestles Were Built to Avoid the Long Haul of Materials for the Permanent Structures

20 passenger trains, not including as many as 10 or 12 extra sections of California trains during the winter and 23 freight trains, a volume which has so severely taxed the capacity of this double-track line as to give rise to frequent suggestions for the construction of a third track. The



How the Cut-off Saves 14 Miles of Train Haul

freight movement on the line south from Florence through Eldorado to Augusta where the routes to the coast and the gulf diverge has been sufficiently heavy to justify the construction of a second track for the 12 miles between Eldorado and Augusta. However, the possibility of saving 14 miles by traversing the hypotenuse of the triangle from Eldorado to Ellinor on the main line led to a decision to build the so-called Eldorado cut-off and to construct a third track from Emporia to Ellinor, in lieu of the third track for the entire distance from Emporia to Florence and a second track from Florence to Eldorado.

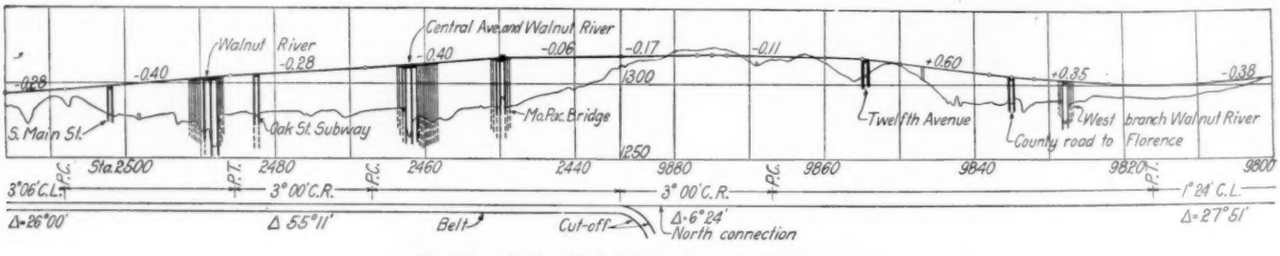
A further consideration is the fact that the construction of a cut-off with a 0.4 per cent maximum grade will afford a 0.4 per cent ruling grade from Emporia to Augusta, whereas 0.6 per cent grades between Florence and Eldorado have precluded the rating of trains on the basis of the more favorable grades east of Florence and south of Eldorado. Another factor which entered into consideration was the local situation at Eldorado, a town of 15,000 population, where the Santa Fe's existing line passes through the business district and is crossed at grade by a large number of city streets and the Missouri Pacific. By extending the cut-off to a connection with the Augusta line south of the city and locating it so as to pass around Eldorado to the east (with an overhead crossing of the Missouri Pacific) and providing a connection with the line to Florence north of the city, a belt line could be provided which would take all of

A Highway Undercrossing at Matfield Green

the freight trains out of the city and very largely eliminate the objectionable grade crossing conditions within the settled portion of the town.

Line Originally Located in 1886

One interesting feature in connection with this project is the fact that it represents the consummation of a project undertaken in 1886, when the Santa Fe projected a line over practically the same alinement as that followed by the cut-off now under construction. The line was located and construction actually undertaken over approximately half of the distance from Ellinor and track was laid and the line was placed in operation from Ellinor to Bazar, a distance of about nine miles, when the project was abandoned. Subsequently, the three miles of line from Ellinor to Gladstone was abandoned because there was another connection from Gladstone to Strong City, the line from Strong City to Bazar having been operated as a minor branch line up to the present time.



Profile of the Belt Line Around Eldorado

The next chapter in the story of this location dates back to 1902 when the Kansas City, Mexico & Orient acquired the location and prosecuted construction to the point of completing a large part of the grading and the bridge substruc-

tures over nearly the entire distance to Eldorado, but this project was also doomed to failure and the tracks were never laid.

When the Santa Fe's management finally concluded to build the line on this location in 1922 efforts were made to acquire the Orient's right-of-way, but title complications attending negotiations to this end defeated this purpose with the result that the Santa Fe line as now being built occupies a location alongside the Orient's right-of-way except in those portions of the line where it was necessary to diverge in order to obtain an 0.4 per cent grade line instead of the 0.6 per cent line adopted by the Orient. Because of this close adherence to the original location, the construction of the line at this time has the effect of providing long

How the Material Was Lifted in the Summit Cut by Shooting to Grade

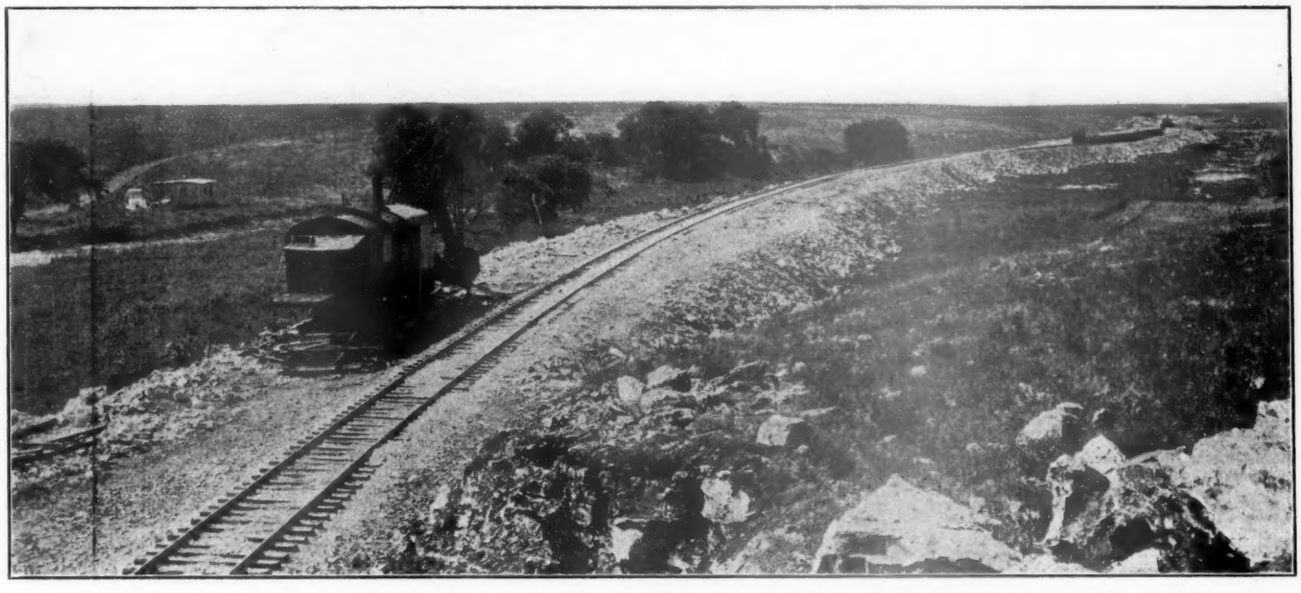
deferred rail transportation for three towns, Matfield Green, Cassoday and Chelsea, which were laid out and settled in the late eighties when the line was originally projected.

General Description

The general plan of the location is simple. From Ellinor, at elevation 1,156, the line follows the drainage of the Cottonwood river and its tributary, Mercer creek, to a summit about a mile north of Cassoday at elevation 1,493 and then descends in a location following the general direction of the drainage of the Walnut river and its tributary, Durachon creek, to a connection with the existing line at Eldorado at elevation 1,293.

From Ellinor to Bazar, the line lies in a flat river bottom, involving very little grading except at stream crossings. From Bazar, at Mile Post 10 to Mile Post 23, the line is in a side hill location involving a succession of short cuts and fills, the work becoming heavier in the vicinity of Matfield Green, Mile Post 18, and also to the west of that station as far as Mile Post 23 in what is known as the Flint hills, a limestone formation containing a considerable intermixture of flint rock from which the name is derived. The heaviest grading in this section is involved in the crossing of Crocker creek, at Mile Post 16, requiring a fill containing 150,000 cu. yd.

The heaviest excavation is in the summit cut at Mile Post 24 which is 7,800 ft. long, has a maximum depth of 28 ft. and contains 120,000 cu. yd. For the remaining distance south to Eldorado, the line occupies both valley and ridge locations in a moderately rolling country involving relatively light grading. However, heavy work is also involved in the last two miles of line at Eldorado, where the line skirts the east edge of the town and crosses over flats bordering both sides of the Walnut river from high land south of the town to land at a higher elevation to the north of it. This portion of the project has the characteristics of an urban track elevation project, since advantage was taken of the situation to cross over the Missouri Pacific tracks and the elevation required to obtain this grade separation afforded opportunity for the construction of four subways for city streets, in addition to two crossings of the Walnut river. A similar condition obtained on the north connection to the existing line where the line is at sufficient elevation to cross over two streets in addition to crossing the west branch of the Walnut river. All of the structures involved in this portion of the work consist of steel girder spans supported on concrete piers and abutments with the addition of creosoted timber ballasted approach trestles in the case of the river bridges.



Character of Country a Short Distance North of the Summit Cut

Program for the Grading

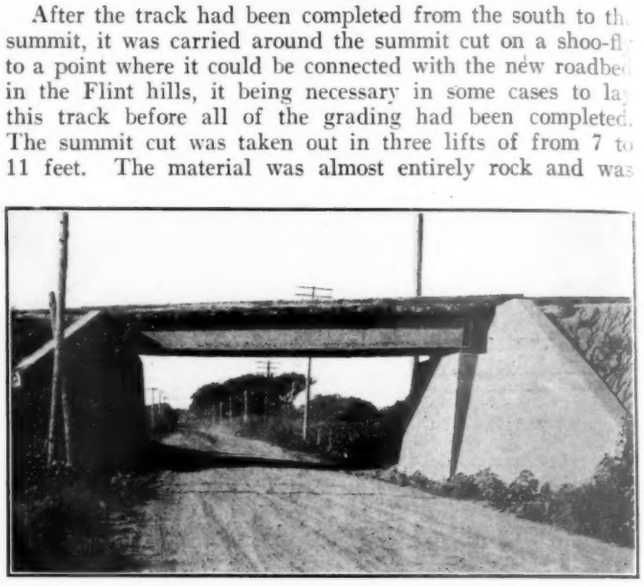
The program followed in the prosecution of the construction work was planned after thorough consideration of the conditions imposed, namely, that the heaviest excava-

tion work, that involved in the summit cut north of Cassoday, was located 15 miles from the nearest railroad station. As economical operation implied the use of a heavy steam shovel for this work with standard-gage dump cars and locomotives which it would not be practical to move in over the highways, it was decided to defer work on this cut until the grading could be completed from one end of the line to a point that would permit the laying of track so that the construction equipment for the heavy work could be moved in over the rails. Although the distance from the end of the track at Bazar to the north end of the summit cut is only about 13 miles, the heavy work involved in this territory precluded the idea of finishing that end first. Consequently, it was decided to lay the track first from the Eldorado end. However, owing to the fact that the south end of the Eldorado loop entailed a 440,000-yd. fill, it was decided to complete the north connection of this loop first. Accordingly, work on this north connection, which was started in August, 1922, had progressed to a point permitting the completion of rail connection with the main line of the cut-off by January 23, 1923. Rail laying from that point northwardly was carried on progressively so that it was completed to Mile Post 25 at the south end of the cut, ready to move in the contractor's equipment in June.

The methods followed in handling the grading varied with the nature of the problems. The work between Ellinor and Bazar was light. On the four miles of new line between Ellinor and Gladstone this consisted primarily of embankments from two to five feet high, except at the crossings of Peyton creek and the Cottonwood river where the grade line was raised to insure that the superstructure of the bridges would clear high water. In the 6½ miles between Gladstone and Bazar, where the Bazar branch is incorporated in the cut-off, the work consisted primarily of rehabilitation of the existing line, including the widening of the roadbed and the relaying of the track with heavier rail. In this section the grading involved only 4,000 to 5,000 cu. yd. per mile. In the side hill work south of Bazar, 2½-yd. shovels with 4-yd. narrow gage cars were used. In this work the grade line was adjusted to give a fair balance of excavation and embankment with relatively short hauls, with the exception of the 150,000 yd. fill over Crocker creek valley. Of this total yardage, the base, involving 90,000 cu. yd., was made from side borrow with teams, while the filling of the remainder, amounting to 60,000 cu. yd., was deferred until the track could be laid from the summit cut so that this fill could be made with material from that cut with a train haul of about eight miles.

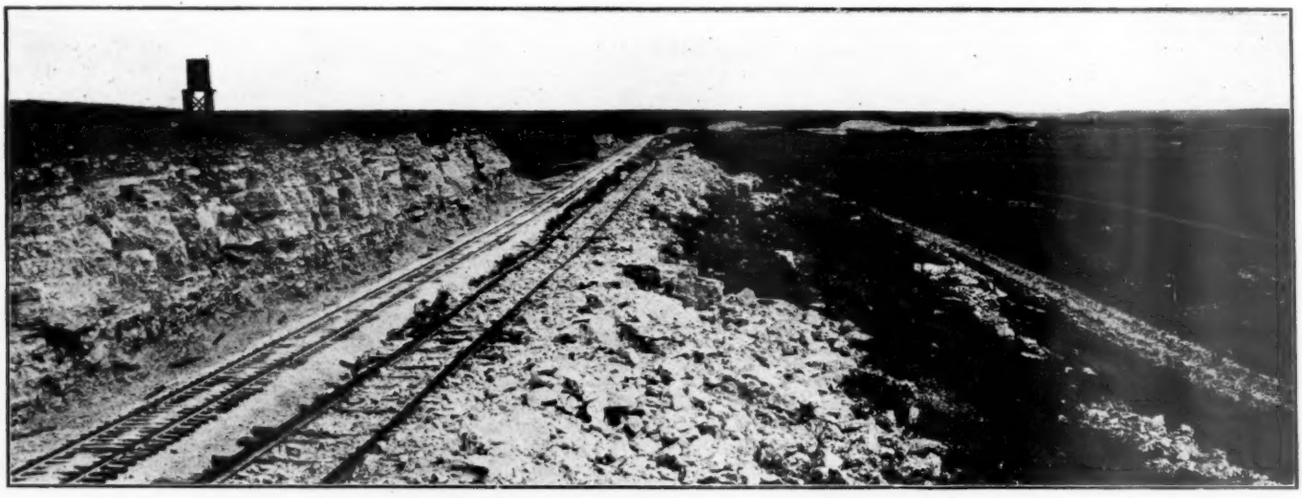
Work in the Summit Cut

After the track had been completed from the south to the summit, it was carried around the summit cut on a shoo-fly to a point where it could be connected with the new roadbed in the Flint hills, it being necessary in some cases to lay this track before all of the grading had been completed. The summit cut was taken out in three lifts of from 7 to 11 feet. The material was almost entirely rock and was shot to grade by means of 4-in. holes placed 8 ft. center to center in both directions, using two well drills for this purpose. From 200 to 250 lb. of a special dynamite was used in each hole. A 90-ton shovel with a 5-yd. dipper was used for this work, the material being hauled in 20-yd. standard-gage cars with 60-ton locomotives.



One of the Subways in the Eldorado Belt Line

Owing to the fact that the work between Cassoday and Eldorado involved a succession of long shallow cuts and fills, it proved more economical to waste considerable of the material in the cuts and build the embankments largely from borrow. In several cuts just south of Cassoday, which consisted primarily of shale and some limestone, a dragline excavator was used to handle the material wasted on either side of the cuts. The 440,000-cu. yd. embankment in the belt line at Eldorado was constructed entirely with team work from side borrow.



Looking North Along the Line in the Flint Hills

Build Wooden Bridges on Account of Long Haul

In addition to the bridges mentioned in connection with the belt line around Eldorado, the construction work involved a considerable number of other stream crossings, con-

sisting in part of steel girder spans on concrete abutments and piers, and a number of concrete culverts and arch spans. However, the inaccessibility of portions of the line influenced the character of bridge construction, since several creosoted pile and frame trestles were built in locations where the waterway requirements would have been met by culverts of relatively small size. One notable instance of this is a 224-ft. frame trestle across Crocker creek, requiring bents 55 ft. high resting on pile bents cut off and capped close to the ground. Estimates of the cost of this structure as compared with the cost of hauling in materials for a permanent structure demonstrated the economy of building the trestles.

The roadbed standards under which the grading for this project was carried out provide for a 20-ft. roadbed on embankment and a 28-ft. width for cuts in earth and a 24-ft. width for cuts in solid rock. The track is laid with 90-lb. rail in 39-ft. lengths, with 1,860 rail anchors and 3,250 ties to the mile, all ties being creosoted hardwood. Another interesting feature in this connection is the fact that 30,000 ties, treated in a variety of ways, have been installed as a test section. Standard rock ballast is being provided for all roadbed on rock while a temporary surface of rock screenings is being used on all earth roadbed. Passing tracks 5,000 ft. long are provided at intervals of about six miles, the grade being reduced to a maximum of 0.25 per cent through passing tracks and for a distance of 2,000 ft. beyond at each end. The total ascent from Ellinor to Eldorado is 423 ft., and from Eldorado to Ellinor 295 ft. The total length of maximum gradients westbound is 14.24 miles and eastbound 9.7 miles. There are 37 curves, the maximum degree of curvature being three degrees.

The grading on the entire project totaled 890,000 cu. yd. of excavation of which 400,000 cu. yd. was handled with steam shovels. The embankment work amounted to 2,065,000 cu. yd. The bridge work involved 15,100 cu. yd. of plain concrete and 6,500 cu. yd. of reinforced concrete, and comprised 1,385 lin. ft. of steel bridges, 60 ft. of open-deck trestles and 2,646 ft. of ballasted deck trestles.

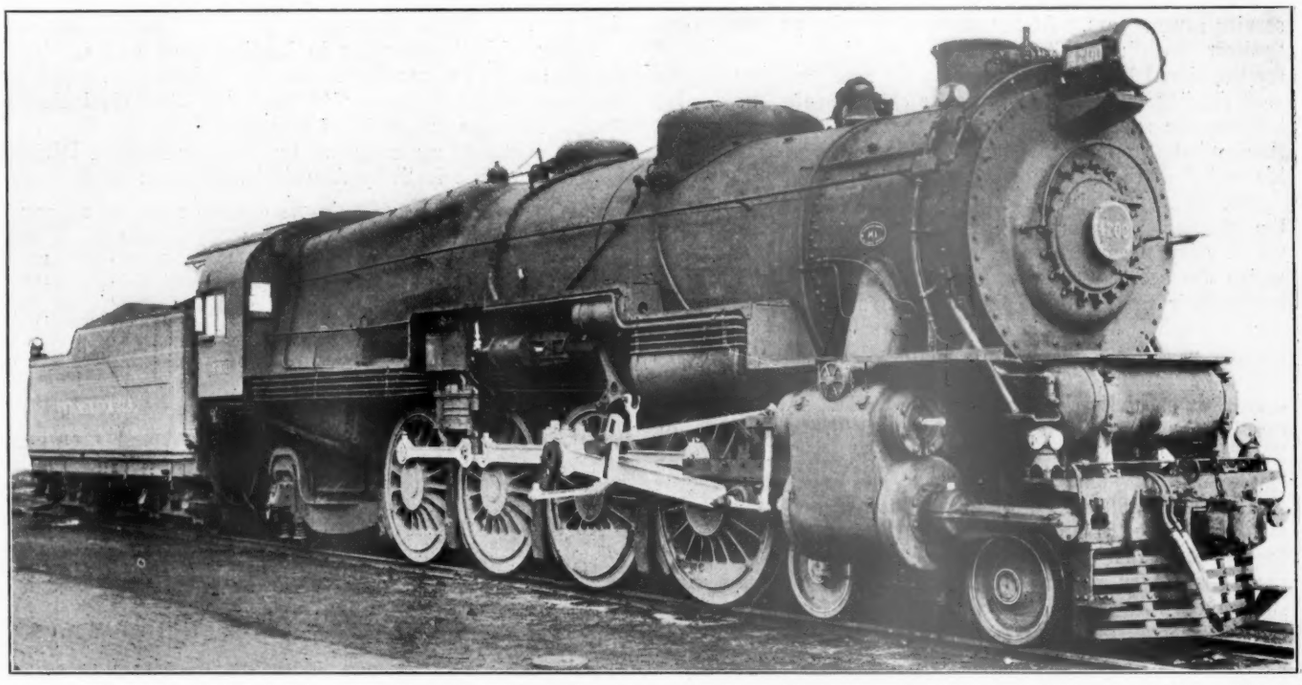
Two water stations were provided on the cut-off, one at Bazar and one at Cassoday. Water at Bazar is obtained from the sub-surface flow in the Cottonwood river, a well 30 ft. in diameter being sunk to a depth of 7 ft. below the normal level of this sub-surface drainage. As this water is hard a treating plant will be provided. The water station at Cassoday will derive its supply from a 350,000,000-gal. impounding reservoir obtained through the construction of an earth dam with a concrete corewall across a ravine.

This project has been carried out under the direction of C. F. W. Felt, chief engineer, Atchison, Topeka & Santa Fe System, assisted by S. E. Ross, assistant engineer at Chicago. The actual construction of the line has been under the direction of J. W. Stewart, assistant engineer, Eldorado, Kan. Bates & Rogers, Chicago, are the contractors, while the track laying was done by Roberts Brothers.

New York Engineer's Report on Forsyth Collision

THE PUBLIC SERVICE COMMISSION of the State of New York has issued a carefully prepared and thorough report, signed by C. R. Vanneman, chief engineer, on the rear collision of passenger trains on the New York Central at Forsyth, N. Y., on December 9, when nine persons were killed and a considerable number injured. This collision was reported in the *Railway Age* of December 15, page 1097. Mr. Vanneman's report, holding the engineman responsible for disobedience of the distant signal (the reason for which disobedience cannot be explained) gives numerous details, not covered in the earlier report.

He says that the automobile which occasioned the stopping of the leading passenger train had been placed on the track sometime between 12:30 a. m. and 1:09 a. m. He was able to interview only two of the three men who were riding in it; the driver, Stratford, was not questioned;



International

The Pennsylvania's New Experimental Mountain Type Locomotive

and after a detailed discussion of the stories of these two men, and of the facts brought out, he does not accept their statement that the train was seen approaching at about the moment that they drove upon the crossing. He estimates that, because of the fog, the headlight of the train could not be seen for more than 1,000 ft. Stratford, the driver, is recorded as having suffered a slight cut on the hand. "How he came by this is not definitely known."

The report says that all four tracks were blocked. The flagman of the standing train had gone back about seven car-lengths. The highway is of concrete except a half-mile approaching the railroad, which was left unimproved because of the expectation that the grades would be separated. The wigwag crossing signals at this point were erected by order of the New York Public Service Commission in 1918. There is also the standard circular sign, set 300 ft. from the railroad; and, in addition, a special warning erected by the highway department indicating that the railroad crossing is dangerous. The New York, Chicago & St. Louis track is 82 ft. from the nearest New York Central track.

The rear flagmen of all of the trains which were stopped performed their duties properly; but the flagman at the front end of the first train went to the rear to see what was the matter at the crossing, when he ought to have gone forward because of the obstruction of one of the eastbound tracks by the wreckage of the automobile. The flagman of the second section is 56 years old and had been 33 years in the service; Engineman Patterson, who ran past this flagman's signals, also is 56 years old and has been in the service 33 years. He has run the Twentieth Century express frequently and has been in passenger service five years. The inspector could get from the engineman no satisfactory explanation of his failure; he said that because of the fog he had been unable to judge of the speed and he "had no idea that he was getting near the stop signal while yet he was right up under it." The inspector quotes details showing that Patterson had told the superintendent on Sunday morning that he slowed down at the caution signal; while at the hearing, on Tuesday, he did not make this claim. In many of the quotations of testimony of various witnesses, the inspector says that the witnesses "claimed" so and so.

Patterson's fireman is 33 years old and had been in the service seven years. At the caution signal Patterson called "yellow block"; the fireman got up on his seat but did not see the signal light. He stayed on the seat "waiting for the next signal" but the first thing he saw was the fusee. He believes the speed was reduced somewhat between the caution and the stop signals; but from the testimony, as quoted, his recital of the course of events seems to be of little value.

Mr. Vanneman, in his conclusion, takes up all phases of the disaster. The automobile could not have traveled the 90 ft. from the crossing in the period of time, 11 seconds, which the occupants of the car indicated was the time between their first sight of the locomotive headlight and the actual crash. As to the crossing, gates are not desirable because of the space between the two railroads in which cars might be caught. Ordinarily the crossing would not be classed as specially dangerous, for there are good views from the highway; but accidents have occurred a number of times; and, because of the short turn in the highway, the employment of flagmen is desirable.

The root trouble with the engineman is that he did not make it a rule to shut off steam at the caution signal. At the speed which he was running—a mile a minute, or faster—ordinary caution should have dictated an immediate shutting of the throttle. It may have been that there was a temporary mental lapse. There was no extreme difficulty in observing the signals. The engineman of the other trains saw all of them, all the way from Buffalo. Patterson does not claim to have had any trouble with his engine or with the signals, until he came to those here involved. The report is silent as to his time off duty, or his health, before beginning this run; but, speaking generally, the inspector says that physical examinations of enginemen are imperative. He does not find that any railroad has such examinations periodically; they ought to be carried out every six months, or at least every 12 months. Automatic train control is discussed only briefly, the subject being in the hands of the Interstate Commerce Commission.

Finally, Mr. Vanneman finds that the practice of running at too high speed past cautionary signals is altogether too prevalent; "officers of railroads deny this, but observations show it to be a fact." Even in the present investigation, one engineman admitted that he was in the habit of "running on the yellow." This practice is liable to lead to taking risks; to anticipating that a signal is going to clear and thus failing, for a long series of blocks, especially on a straight line, to strictly comply with the rule requiring a stop signal to be approached always under complete control. "Whether this practice had any influence on the present case is unknown; but it may be minimized by vigilant supervision."

In closing, the report says that the elimination of this highway crossing was ordered on June 14, 1922, but that the order has not been carried out; this delay has been due to an appeal to the higher court taken by the New York, Chicago & St. Louis.

Freight Car Loading

WASHINGTON, D. C.

FREIGHT CAR LOADING continued to decline during the week ended December 15, when the total was 899,522 cars. This, however, was an increase of 20,470 cars as compared with the corresponding week of last year and of 173,448 cars as compared with the corresponding week of 1921. Loading of grain and grain products, coal and coke showed decreases as compared with last year and coal loading amounted to only 176,138 cars. This, however, was an increase of nearly 300 cars as compared with the week before. Loading of merchandise and miscellaneous combined showed an increase of 32,000 cars as compared with last year.

Along with the decrease in loading there was continued an increase in the number of surplus freight cars, which for the week ended December 14 averaged 216,936, including 81,853 box cars and 111,734 coal cars.

The summary as compiled by the Car Service Division of the American Railway Association follows:

REVENUE FREIGHT CAR LOADING—WEEK ENDED DECEMBER 15, 1923

Districts	1923	1922	1921
Eastern	220,728	222,856	180,505
Allegheny	186,266	192,076	149,173
Pocahontas	36,745	30,159	25,073
Southern	135,545	132,164	112,610
Northwestern	118,107	104,313	89,886
Central Western	141,775	141,212	110,339
Southwestern	60,356	56,272	58,488
Total Western districts	320,238	301,797	258,713
Commodities			
Grain and grain products	50,741	50,985	47,594
Live stock	40,821	38,503	33,918
Coal	176,138	195,251	134,789
Coke	11,311	13,175	7,165
Forest products	67,017	59,828	47,978
Ore	11,064	11,011	5,505
Mdse. L.C.L.	239,833	224,312	222,463
Miscellaneous	302,597	285,987	226,662
Total	899,522	879,052	726,074
December 8	913,774	909,174	741,341
December 1	835,296	840,412	741,849
November 24	996,217	946,642	673,465
November 17	991,745	957,564	790,363
Cumulative loading for year to date	48,322,282	41,677,025	38,127,997

Revision of Operating Expenses Classification

I. C. C. Bureau of Accounts Has Offered Tentative Text for Criticisms and Suggestions

THE WORK OF REVISING the classification of steam railroad operating expenses, under consideration for the past year or more, has now progressed to a point where the Bureau of Accounts of the Interstate Commerce Commission is able to supply copies of the new classification to interested parties.

The text, in its present form, is intended only as a "working tool" and is offered, as Director Alexander Wylie of the Bureau of Accounts puts it, for the "purpose of eliciting constructive criticisms and suggestions which may be helpful in the effort to perfect the classification when finally revised by the commission."

The work of revision, as it has thus far proceeded, has been carried on with the co-operation of a committee of the Railway Accounting Officers' Association.

The proposed classification adheres to the present method of classifying the expense accounts by departments. Important changes from the present classification include a reduction in the number of primary accounts; the subdivision of the primary accounts under the heads of labor, material and miscellaneous; the exclusion of all items of rent from the expense accounts so that all such items in the future will be chargeable to income; the eliminating of equalization accounts; the establishment of certain new primary accounts such as that under maintenance of way of "Work-train service" or under equipment department expenses of "Preparing motive power," "Preparing cars," etc., and the establishment of a new general account V, Other Departments and Expenses, with such new primary accounts as 402, Accounting, 405, Purchasing and Stores, etc. The present tentative classification does not contain details concerning the depreciation accounts as the work relating thereto is not yet far enough along.

In the text of the proposed new classification there is an introduction prepared by Director Wylie giving a summary of the principal changes in the proposed classification as follows:

Consolidation of Accounts

The number of primary accounts in the proposed classification is considerably less than the number appearing in the issue effective July 1, 1914. The reduction has been accomplished by means of consolidation of a number of the primary accounts in those cases where it appears that the new consolidated account will answer the reasonable requirements of the commission, of the public and of the carriers themselves for statistical and comparative purposes.

Much has been said with respect to the alleged burdensome accounting requirements of the Interstate Commerce Commission in connection with efforts of the carriers to keep down accounting expense.

Much difference of opinion exists, apparently, with respect to economies claimed for an abridged system of accounts as compared with the more elaborate distribution of operating expenses required by the effective regulations. It is held by some that a reduction in the number of primary accounts to which operating expenses shall be distributed would effect little or no reduction in accounting expense, whereas the value of statistics procurable from the more elaborate distribution would far more than offset the slight additional expense incident to the more ample analyzation of expenses.

The abridgment of the classification in this respect is offered for suggestion and criticism by those interested. It should be remembered that the option will be extended carriers to subdivide the proposed primary accounts. If a large majority of the carriers continue the more elaborate distribution of expenses for their own purposes, it would appear that the alleged excessive accounting expense is not a matter traceable to governmental regulation but to the executive policies of the carriers themselves.

Rents Chargeable to Income

Payments for the use of property of others are regarded as properly chargeable to income, and the proposed classification of operating expenses excludes all items of rent. The suggested new rules provide that when compensation for the use of property of others includes rent and maintenance, but not operation, it shall be charged to the appropriate rent account in income or to the cost of the work on which used, as may be appropriate. Payments to a lessor in reimbursement of actual expenditures for repairs or charges to depreciation shall be charged to the account appropriate for similar expenses on owned property. Fixed sum compensation shall not be apportioned to cover repairs or depreciation.

One object of the proposed change has been to avoid a somewhat complicated accounting required of the old classification in connection with the apportionment of rental payments as between maintenance, operation and rents. These apportionments are usually on an arbitrary basis, resulting in a considerable lack of uniformity as between carriers and accomplishing accounting results not warranted by the amount of detailed accounting required to apportion rental payments to operating expenses and partly to the income accounts.

Loss on Property Retired and Not Replaced

Under the effective accounting rules, loss on all fixed property retired and not replaced is chargeable to profit and loss.

The proposed classification requires that all service loss on all property retired shall be charged to operating expenses on the theory that operating expenses over a period of years should reflect on the full cost of maintaining property used in transportation service. This end would be accomplished under the effective regulations by those carriers which accrue depreciation on fixed property. It seems appropriate that the same accounting results should be obtained by all carriers and that no such important variation in operating results should be left to the option of carriers.

218, "Insurance"

The character of the insurance accounts has been changed to make them clearing or equalization accounts through which to account for insurance recoverable, creditable under the old classification to the maintenance account appropriate for repairs of the insured property. In other words, the insurance account in the proposed classification shall include premiums paid and insurance recovered, the repair accounts thus retained to show the full amount of expenditures for repairs.

Heretofore little basis for comparison has existed as between the accounts of carriers insuring their own property; those placing insurance with outside companies; and carriers operating without insurance and charging losses directly to the primary repair accounts as such losses are sustained. Under present rules insurance recoveries are creditable to the repair accounts and act in a large measure to offset losses chargeable to such accounts. Under the proposed new accounts for insurance, the repair accounts will reflect losses from insurable casualties, while the primary accounts for insurance will act as equalization accounts to cover premiums paid and insurance recoveries. In this way the primary accounts of all carriers will be on a comparable basis.

Equalization of Expenses

The proposed classification withdraws the option contained in the old regulations, relative to the equalization of maintenance expenses. The function of accounts is to show facts, not ends desired but unattained. The whole purpose of equalization accounts is the accomplishment of uniform operating results, such results not conforming to actual operating conditions. If ties are renewed during the summer season only, the accounts should reflect that fact. Equalization accounts would indicate that an approximately equal number of ties are renewed throughout the 12-month period, an accounting results directly at variance with the operating fact.

Separation of Labor, Material and Miscellaneous Items

The primary accounts for operating expenses shall be kept so as to show separately, in subaccounts, charges for labor, material and miscellaneous items. The study of wage problems, rate cases, etc., under modern conditions, demands a more accurate knowledge of the content of operating expenses with respect to the factor of labor as distinguished from material used in maintenance work and

items of a miscellaneous character. The demand for this separation and the value of statistics to be procured from such a classification is thought to warrant the requirement that the items named above should be separately reported by the carriers.

V, "Other Departments and Expenses"

This general account supplants in a general way, account VII, "General," but the rearrangement under the proposed plan provides primary accounts along departmental lines in order that the classification may conform more nearly to the usual railway organization. For example, expenses of the accounting department formerly classable in several primary accounts in general account VII, have been brought together in primary account 402, "Accounting." The same is true with respect to other primary accounts in this group such as 403, "Treasury," 405, "Purchasing and stores," 406, "Real estate and taxes," 408, "Police," 410, "Claims organization," etc.

The former distribution of expenses by which salaries and expenses of general officers of all departments were charged to account 451, similar expenses of clerks and attendants to account 452, and general office supplies and expenses charged to account 452, served no valuable purpose from a statistical or comparative viewpoint, and most carriers maintained separate records of expenses by departments. The present arrangement lends itself to comparative studies and furnishes direct information to supervising officers relative to the cost of maintaining the various departments indicated.

VI, "Compensation for Damages"

Liability for damage arises from a variety of causes, the responsibility for the damage often being undeterminable. It seems appropriate, therefore, that a general account for expenses of this character should be raised in order to bring together expenses incident to the settlement of such liabilities.

225, "Crossings and Signs"

This account has been eliminated and items formerly classified therein have been distributed to other accounts of the new classification as follows:

To account 202, "Roadway maintenance," maintenance of earthwork approaches to crossings, renewal of crossing plank, and maintenance of crossing drains.

To account 207, "Fences and signs," the expense of repairing track and crossing signs and highway crossing gates.

To account 208, "Bridges, trestles and culverts," maintenance of overhead structures carrying roadways or tracks over carrier's tracks.

The purpose of the redistribution of items formerly carried in account 225 was in the interest of a reduction in accounting returns that had only a limited value for statistical purposes and to permit the classification of expenses more nearly according to the departments incurring the expense. For example, section gangs as a rule maintain earthwork approaches to crossings, crossing plank and crossing drains, while bridge gangs maintain overhead structures, and gangs assigned specifically for the purpose ordinarily maintain track and crossing signs and highway crossing gates. This is in conformity with the establishment of department accounting as embraced in the general accounts of the new classification.

221, "Work-train Service"

This new primary account has been raised to include the expense of operating work trains engaged in maintenance work to avoid the rather detailed distributions required under the old classification rules under which work-train expense was distributed to the primary accounts chargeable with the cost of the work in which the train was engaged.

It is thought that a considerable reduction in clerical expense will be effected by charging to one primary account the expense of operating work trains engaged in maintenance work as distinguished from the present practice of distributing on more or less arbitrary bases such expense to various primary accounts according to the character of the work performed. The new arrangement also affords direct information regarding the expense of operating work trains and will permit a more careful supervision by operating officers.

259, "Shop Expenses"

This new primary account has been raised to include shop expenses previously handled through the clearing account of that title provided for in section 15 of special instructions relating to operating expense accounts.

The reasons for the inclusion of a new primary account in which to include shop expenses are very much the same as those which impelled the adoption of a new primary account to cover work-train service referred to above. At present shop expenses are distributed among a large number of primary accounts which shop expenses now effect. Equally satisfactory results from a statistical viewpoint will be procured by use of one primary account for shop expenses, and it will avoid a detailed proration of balances in the clearing account for shop expenses.

260, "Preparing Motive Power"

This new account raised under general account II, "Equipment department," shall include items formerly chargeable to accounts

Partial List of Accounts Proposed for New Classification

There follows a list of the general and primary accounts proposed to be included in the new classification. The number of primary accounts shown is 79, but the list is not complete because the commission has not yet formulated its new instructions relating to depreciation and retirements or determined the number of accounts which will be necessary.

I. Roadway and Structures Department

201. Supervision
202. Roadway maintenance
203. Ties
204. Rails
205. Other track material
206. Ballast
207. Fences and signs
208. Bridges, trestles and culverts
209. Tunnels and subways
210. Roadway and shop structures
211. Station and office buildings
212. Fuel and water stations
213. Telegraph and signal systems
214. Electric transmission systems
215. Miscellaneous structures
216. Machines and tools
217. Public improvements
218. Insurance
219. Stationery and printing
220. Other expenses
221. Work train service
222. Joint facilities—Dr.
223. Joint facilities—Cr.

II. Equipment Department

251. Supervision
252. Equipment-shop and power-plant machinery
253. Locomotive repairs
254. Freight car repairs
255. Passenger car repairs
256. Floating equipment repairs
257. Work equipment repairs
258. Miscellaneous equipment repairs
259. Shop expenses
260. Preparing motive power
261. Preparing cars
262. Insurance
263. Stationery and printing
264. Other expenses

III. Transportation Department

301. Supervision
302. Dispatching trains
303. Station service
304. Transfer and delivery service
305. Yard service
306. Fuel for yard motive power
307. Electricity for yard motive power
308. Train service
309. Fuel for train motive power
310. Electricity for train motive power
311. Sleeping car service
312. Water transfer service
313. Line vessel service
314. Signal and interlocker operation
315. Crossing protection
316. Insurance
317. Stationery and printing
318. Other expenses

IV. Traffic Department

351. Supervision
352. Solicitation
353. Advertising and development
354. Stationery and printing
355. Other expenses

V. Other Departments and Expenses

401. Interdepartmental expenses
402. Accounting
403. Treasury
404. Law
405. Purchasing and stores.
406. Real estate and tax
407. Telegraph and telephone
408. Police
409. Dining and hotel service
410. Claims organization
411. Valuation
412. Pensions and relief
413. Incidental operations
414. Other expenses

VI. Compensation for Damages

451. Injuries to persons
452. Damage to shipments
453. Other damages
454. Insurance

VII. Transportation for Investment—Cr.

470. Investment credits

388, "Enginehouse expenses—Yard," and 400, "Enginehouse expenses—Train," listed under general account IV, "Transportation —Rail line."

The transfer of enginehouse expenses from general account III, "Transportation department," to general account II, "Equipment department," has been in recognition of the function of the mechanical department to prepare motive power for service in connection with its duties of maintaining such power. The expense of preparing motive power accrues primarily in the records and accounts of the mechanical department, and the division of such expenses as between maintenance chargeable to general account II and preparation chargeable to general account IV, has been necessary in the past for classification purposes only. It seems appropriate that under the departmental classification all expenses incurred by the mechanical department in maintaining and preparing motive power shall be included in the same general account in operating expenses.

261, "Preparing Cars"

This new primary account has been raised to include items of expense incurred in preparing cars corresponding to similar items in connection with the preparation of motive power for service.

The expense of preparing cars for service is included in account 402, "Train supplies and expenses," in the old classification. Following the principle applied to the preparation of motive power, the expense of preparing cars for service should be accounted for by the department responsible for the expense, and expense of this character is not an expense of train operation but one incurred by the mechanical department in caring for and keeping in fit condition the equipment of the carrier.

304, "Transfer and Delivery Service"

This new primary account shall include items formerly chargeable to the revenue accounts where payment is made to other than a common carrier, the idea being to have the operating revenue and operating expense accounts prepared by the carriers so as to prevent duplications and omissions. The theory is that the full expense incurred by common carriers in accomplishing transportation and earning the operating revenues incident thereto, should appear in the operating expense accounts.

Where payment of an expense of this nature is made to a common carrier, the deduction from revenue in the accounts of the debtor will be reflected as a revenue item in the accounts of the creditor, and operating revenues as a whole will be correctly stated. Gross revenues will not be accurate if payment be made to other than a carrier and charged to a revenue account. It is to overcome this inaccuracy that payments to other than common carriers shall be treated as an item of expense.

The Motor Bus As An Adjunct to the Railroad

By R. S. Williams

WHILE FREQUENT MENTION will be made in this article of the railroads and some of the traffic problems which confront them, it must not be supposed that the writer is assuming any authority as a traffic expert, but this discussion deals with the relation between the railroad and the small town—and I certainly do qualify as an expert on small towns. Main street, as exemplified by the small country town, served as my home for the first 25 years of my life.

At the tender but violent age of 15 I was one of the most virulent inhabitants of a metropolis boasting 160 souls when everybody was home. The railroad bounded the city on one side, my parental home the other side, and I bounded back and forth between, traversing the two blocks of Main street in nothing flat if I heard a train whistle.

Going down to the depot to see the train come in was part of the regular duties of all citizens, young or old of both sexes, not otherwise engaged at tasks of an extremely confining nature. It was what was called a mixed or accommodation train. To tell the truth, the accommodations were somewhat limited. The single yellow day-coach trailing at the end of 10 or 15 box cars, preceded by a wheezy little engine, created the illusion of a giant sunflower being dragged along the countryside by an asthmatic rat terrier.

But it was all we had and who were we to carp at our sole connection with the outside world. It looked like romance indeed to a 15-year-old to see the "brakie" ride a string of empties down the lone side track. And "Dad" Ryan, the conductor—he was a personage—a widely traveled individual with a voice like a foghorn, and when he called "Aboard" the train moved as majestically away from the station as the Twentieth Century ever glided out of Grand Central—provided the engineer happened to be looking backward at the time to catch the signal. True, "Dad's" run was only 38 miles long, but he was a thrifty individual, and it was bruited about that during 12 years of flitting up and down this stretch he had garnered enough to buy a handsome farm against the day of need when some nosey railroad officer should learn of his activities and sever his connection with the road.

So the arrival of the train was an event in the day's monotonous grind. In a town of 160 population nothing important is likely to happen during the course of a sleepy day, and barring an occasional, but not to be counted on, runaway, the passing of "Dad" Ryan's "steam wagon," as the station agent facetiously styled it, was the only thing that was practically sure to occur sometime during the afternoon (exact time of arrival always problematical).

This little village, where one could stand in the geometrical center and look out of town in any direction, is typical of thousands of places in this great land of ours. Upon more serious investigation one learns that an immense amount of money changes hands in the course of a year. In the town we have just described, the seven grain elevators have paid out over two million dollars to the farmers in 12 months. From 250 to 300 carloads of stock are loaded from the little four-section stock yards. The three general merchandise stores, the hardware man, the two farm implement dealers, the druggist and the ice cream parlor do a combined business of $300,000. The creamery ships a weekly average of 100 cans of cream. The little joke book hotel counts it a bad day when it does not serve 10 to 20 traveling salesmen. There is big business done in this little town and in thousands just like it scattered over the length and breadth of the nation. The bulk of this business is done with the farmers. When threshing starts in the fall, the town apparently never sleeps. The chug, chug of gasoline engines in the elevators echoes all through the night.

The Railroad Handles It All

Every dollar's worth of this business is done, every pound of grain, stock, produce and merchandise is moved, every passenger is transported and every piece of mail is brought in and out with *one train a day*. Up one afternoon and down the next. A salesman who gets off the train may be able to complete his business in 30 min., but he can't get out of town until the next day unless he has access to an automobile.

Yet the railroad claims that the traffic on this line does not warrant more frequent service and cites figures to show that the present service is not profitable. There is no reason to disbelieve this statement. We do not have access to the railroad company's books, but that is what they say, and for the purposes we have in mind it suits us to accept their statement at par.

The present train service on dozens of branch lines is unsatisfactory and inadequate, yet the railroads cannot provide better. This has a tendency to cause several effects. Farmers who are tributary to more than one line will haul further by several miles if the more distant line offers the better service. Poor railroad service restrains people from traveling unless it is absolutely necessary. It discourages the better class of business men from locating in small towns where, although the prospects for business are bright, the

handicap of transportation is a bogy and it is a big obstacle to the traveling commercial men who often have been forced to buy automobiles or run up huge expense accounts for livery.

Another result of this unsatisfactory transportation situation has been to create competing motor bus lines parallel to the railroads in question. In fact, the motor bus is already a strong competitor of the railroad where the parallel roads are paved or hard surfaced. These buses are hauling passengers, express and light freight, and, when carefully driven and well managed, are making money. That is all very well where the buses can follow the hard roads, but what provision can be made for the little branch line of towns where road connections are of the dirt variety. There are too many days during the winter and spring when the roads become impassable for any vehicle of such size as a motor bus. Therefore, the service is uncertain and can never be expected to pay an attractive profit.

The Solution of the Problem

The solution lies with the railroads themselves. They have the roadbed and track already laid. Their one or two trains a day do not pay. They could turn a non-producing line into a profitable one by the installation of motor railroad cars. This idea is not advanced as something original with the writer or even particularly new. Like every other improvement offered to the railroads, the actual adoption moves slowly. In the United States, the automatic coupler had to be forced on the railroads by an act of Congress, ludicrous as that fact now seems.

A gasoline motor car built with compartments for passengers, mail, express and light freight can be operated at a fraction of the cost of the running expense of a train. It would do all of the work of the train, except the hauling of heavy freight, and would give the towns along the line better and more frequent service than that ever contemplated in their wildest dreams. The grain, stock and heavy freight could be hauled by the old method but service could be curtailed. When a town had one train a day for all classes of trade, the heavy freight traffic could be handled satisfactorily under the new plan twice or three times a week.

This plan of transportation, if put into effect on branch lines of 50 miles length or less, would have a happy effect in more ways than one. First, it would turn a non-paying branch line into a profitable venture for the railroad company. Second, it would give passengers, townspeople, farmers and commercial travelers, a service in and out of town that would be of some practical use. Third, it would keep people in small towns better satisfied and thus have a tendency to build up these places with a better class of citizens and business men. Fourth, it would bring trade to the larger cities by making it easy for patrons to come into the terminal and get home the same day. Fifth, it would discourage the use of automobiles by commercial men.

The writer has been told that it costs $5 to stop and start a heavy passenger train. He does not know how this figure is arrived at nor can he vouch for its accuracy but it is a figure that has been commonly accepted. Certainly, it costs something in money and much in good will of the passengers to bring a 1,500-ton Pullman train to a grinding stop at a little way station only to see one or two passengers get on and a mail bag thrown off.

Why do the railroads persist in this uneconomic practice? When the writer was on the road as a traveling salesman he frequently boarded No. 12, one of the heavy transcontinental trains on the C. B. & Q. at a division point 102 miles from home. The 102 miles were traversed in three hours and this heavy train, carrying regularly from 12 to 14 cars, coaches, diner, Pullmans and observation, would be stopped 8 times in that distance. Many times I have been on this train when the engineer could barely start the load after stopping. The driving wheels would slip and he would back into the slack and jerk the tea out of the cups in the diner before he got under way.

Not only is this costing the road real money that should be diverted to more useful ends, but it disgusts the passengers who vow never to travel on that road again if they can find any other means of transportation. Ninety-nine passengers out of a hundred who get on a limited train appreciate constant travel without stops more than they do tremendous bursts of speed. The train running at 40 to 50 miles per hour constantly from one division to another, will have few discontented passengers aboard. Let the same train begin making frequent stops at little way stations and a speed of 75 miles per hour between will not prevent the same passengers from champing restlessly on the bit.

In talking to a trade journal editor a few days ago, he related a circumstance which he claims is common. He was at a little station five miles out of his home city and after buying his ticket home at a cost of 11 cents, he was surprised to see the station agent set the flag against the approaching train, which was a first-class Pullman train. He was the only passenger to board the train which had been brought to a stop five miles from its destination and started again with difficulty, to take on a cash fare of 11 cents. He was told that this is a regular procedure at this and other stations along the line. They are flag stops for the big trains which go through only if they are not flagged. It does not require a college education to know that there is no money in stopping big trains to take on one or more 11-cent fares.

A railroad man recently expressed the opinion that eventually the railroads will install gasoline motor cars to take care of local traffic between cities 50 to 100 miles apart or possibly over regular divisions. Such cars could be operated at low cost. This would give the local traveling public more frequent service than they now enjoy and would permit limited trains to make better time across the continent without increasing the actual speed. It would mean a saving of money for the railroads in operating their heavy trains; it would attract a greater patronage, both local and transcontinental, and it would infinitely increase the good-will of the public which will always choose the train with the least stops.

Individual railroad men have repeatedly expressed themselves as convinced that motor trucks equipped for use as railroad, passenger and express cars will be used for handling local and short-haul traffic. The difficulty will come in effecting the needful change. Large bodies move slowly and railroad companies move even slower than that, so it is not to be anticipated that these cars will be seen on the railroads in large numbers immediately. Like every other improvement offered to the railroads, it will be adopted eventually and then the public will wonder how it ever got on without such a convenient and flexible mode of transportation.

Another field for motor buses is already making considerable headway in various sections of the country where roads are good. That field is the serving of inland towns. There are thousands of little villages throughout the nation which are isolated and have no railroad facilities, yet frequently these tiny hamlets do a lucrative business over a wide territory. Commercial travelers must "make" these places at periodical intervals and thousands of pounds of freight must be moved. The motor truck is the solution and already, where roads are hard surfaced, is carrying passengers and merchandise to and from these inland towns.

It is doubtful if any man can accurately foresee the lengths to which commercial, cross-country transportation for passengers and freight will be carried. It is safe to say, on the basis of what we can already see, that the field presents wonderful possibilities for development. Manufacturers, dealers and salesmen can properly combine together to foster the issue.

Possibilities and Limitations of Fusion Welding*

The Welders' Opinion of How Electric Arc, Gas, Thermit and Resistance Welding Should Be Used

PART II

THAT THE OXY-ACETYLENE WELDING PROCESS will play an increasingly important role in our industries is indicated by the fact that institutions of higher learning are now offering courses of instruction in the fundamentals of welding. In some of the larger cities even the

Building Up the Center Plate of a Car Bolster with the Gas Flame

high schools are doing their share, and in every case where any of the mechanical arts are taught, instruction in oxy-acetylene welding is now being given. Manufacturers in large centers are becoming enthusiastic and are organizing and conducting welding schools at their own expense.

There are many reasons why manufacturers should use a welding torch in preference to rivets, one of the most important being the fact that fittings of almost any nature can be attached in any position with ease, allowing a much greater latitude in design and structure. Steel castings may be fused to cold rolled shafts or other stocks, thereby opening up another lane. Fuel tanks, fenders, pressed steel wheels, rims and pulleys are some of the possible applications of oxy-acetylene welding.

In repair work oxy-acetylene welding has made possible a saving of many parts which otherwise would have to be thrown away. Some special applications are found in the reclaiming of cracked castings in foundries, the filling of blowholes in castings, the adding of metal to worn surfaces to secure the original size, the welding of pipe without removal, the filling of drill holes that have been incorrectly located and the sealing of riveted seams, thereby securing absolutely tight joints.

In the field of oxy-acetylene welding a further extension of the process to maintenance and repair work has led to the building of central welding shops which are quite to be compared to machine shops as run by large plants for maintenance work.

A study of maintenance and repair welding has brought out very strongly that there has been a lack of knowledge as to the correct methods of handling cast iron welding. When plants have been instructed to preheat work properly and follow the welding operation with annealing, the results have been practically 100 per cent good. Similarly in other kinds of work where failures have occurred they are traced to lack of knowledge as to proper methods to be employed or willful negligence.

A notable example of recent applications is the welding of oil pipe lines. A 140-mile 8-inch pipe line was welded

The Joining of Sections of Pipe for Pipe Lines to Carry Water, Air, Gas or Steam Under Pressure is Now Done Extensively With the Oxy-Acetylene Blowpipe

by the Prairie Pipe Line Company, and has been giving excellent service for practically a year. This line carries 750 lbs. oil pressure as its maximum and has had a thorough test under working conditions due to the usual washouts during the heavy rains in northwestern Texas.

During the past year two 1,000-barrel oil storage tanks were gas welded. These tanks were tested by putting 2 inches of kerosene on each bottom after the first rings were welded in place and they proved to be absolutely leaktight. After the joints were completed they were filled with water and all joints were hammered with heavy wooden mallets. If more adequate or more severe tests could be thought of

*Abstract of paper prepared by the meetings and papers committee of the American Welding Society for the Fall meeting of the Society, held at Pittsburgh, October 24-26, 1923.

by those who were interested in the construction of these tanks they would have been applied.

Oxy-Acetylene Cutting

Oxy-acetylene cutting at first was restricted to wrought iron and steel, and the principal applications are still the cutting of steel. Within the past four years gray cast iron cutting has been made possible, and while cast iron cutting is frequently regarded as an emergency method of separating a casting, it nevertheless is a method of great value in many cases, some of which are not in the emergency class.

Boiler side sheets, flue sheets, tubes, flues, crown-bolts, stay-bolts and rivets are cut with the torch, the process saving time and labor to an extent hardly dreamed of by those unfamiliar with present locomotive repair practice. Frames are beveled for welding when cracked or broken. Bolts are cut off and burned out when stripping the locomotive for repairs, and in many other ways the cutting torch is employed as a tool of general utility for removing worn parts that require replacement.

One of the astonishing applications of the cutting process, to the engineer familiar with the older methods of practice in railway shops, but not up to date on present methods, is the removal of broken stay-bolts and the cutting off of new staybolts that have been screwed in place, thus making them ready for heading over.

An expert cutter can perforate and cut off a broken stay-bolt one inch in diameter or less in 10 to 12 seconds, and keep up the performance for hours. Records are available

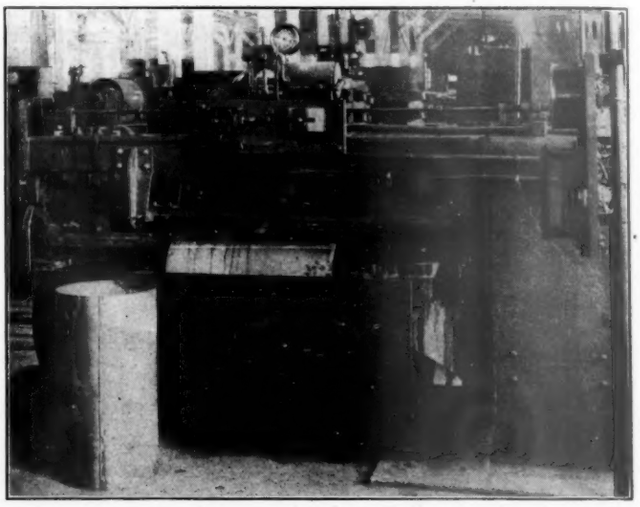
Gas Welding Applied to the Construction of Car Seats

of staybolt burning at the rate of 300 to 350 per hour. Replacement staybolts are cut to length for heading down somewhat faster. The cutting torch is a valuable auxiliary tool to the welder. With it he bevels parts to be welded. Shallow cracks are quickly opened up with the torch at any angle required for a sound weld.

The cutting torch has greatly changed steel foundry practice. The gates and risers are cut off on the foundry floor often while the castings are still hot.

Forge shops are using the cutting torch to advantage as an auxiliary in forging operations, thereby saving time at the hammer and hot, arduous cutting operations. Moreover, the judicious use of the cutting torch has reduced the cost of certain forging operations by simplification. For instance, a crankshaft forging is very much simplified and the cost reduced by planning the operation with reference to gas cutting. The cost of forging operations has been reduced 50 per cent in certain cases.

Pipe welding has rapidly gained favor for gas lines, oil lines and water lines for fire protection in large industrial plants. The cutting torch is indispensable to the pipe welder; in fact, the welding torch and the cutting torch have replaced the pipe tongs and pipe cutters. The torch is used for beveling the joints when not beveled at the mill, for cutting pipes at angles, in making up ells, tees, crosses, headers, etc. If an outlet is required at any point it is a quick and simple matter to cut the opening required for the insertion of the nipples to be welded in.



A Resistance Welding Machine Used for Welding the Side Seams of Transformer Tanks

Many hundred thousand cubic feet of oxygen are consumed annually in the scrap yards cutting up old boilers, machinery and miscellaneous scrap. In some places heavy cast iron scrap is also cut with a torch because local ordinances forbid the use of a drop ball for breaking.

The possibility of fixing the cutting torch in a machine having provision for holding the torch at any desired angle and traversing it at a predetermined even speed was recognized early in the development of gas cutting. Several machines of the stationary, portable and semi-portable types have been developed successfully. Mechanical cutting is smooth and true. In many cases the cuts may be made so smoothly and with such exactness that no further finish is required. Parallel rod and main rod ends are cut in some railway shops to the line and no further finish on the outside is given them.

Not the least important of the many uses for the cutting torch is cutting rivet holes in beams, channels and other structural shapes in the field. Of course, a rivet hole cut with a hand torch must be reamed to remove the irregularities and make possible a tightly fitted rivet.

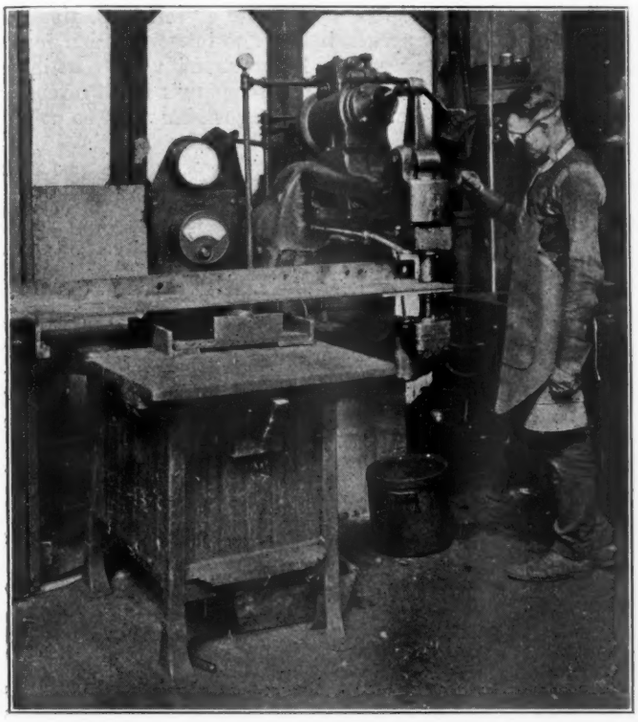
This review touches only a few of the high spots in modern gas cutting practices. Cutting no longer is simply cutting—it has many diversified applications. It is quite possible to use cutting unwisely or to employ it inefficiently. Engineering study and intelligent supervision are as necessary for the success of gas cutting as for other activities of the railway or industrial plant.

Resistance Welding

Resistance welding is used in the manufacture of many articles we use every day, including the welding of the stems

in watches, the rims of our eye-glasses, the handles of knives and forks, the rims and frames of our baby carriages, our automobiles, rims for truck wheels, handles on wrenches, chisels and hayforks, shanks of mild steel on high-speed drills, reamers and cutters, chains for all purposes and of all sizes. The term, "resistance welding" applies to seam welding, spot welding and butt welding.

Seam welding has now been developed so that two ⅛-inch sheets may be successfully welded and the length of seams can be practically anything that can be secured in commercial stock. It can be applied to the manufacture of steel barrels, casks, tanks, culverts, smoke-stacks, ventilators, conveyor tubes, heating and ventilating pipes, etc. The seams can be made at the rate of 40 ft. per min. on two 1/16-in.



Welding Two ½-in. Plates with a Spot Welding Machine

sheets and 20 ft. per min. on two ⅛-in. sheets without any scarfing or special preparations of stock.

"Spot welding" machines have now been developed that are entirely automatic as regards time and pressure so that the welder functions in the same way each time, and makes all welds alike. One electrode is stationary while the other slides on a carriage which is moved up and down by a revolving cam. A coil spring between the electrode and carriage insures uniform pressure of the work piece and the speed of the cam is such that the electrode is in contact with the work just long enough to secure good fusion of the pieces, probably one or two seconds. A commercial spot welder has now been developed for welding two plates of a thickness of one-half inch.

Through the application of butt welding, steel castings or complicated machine parts are being replaced by either drop forgings or steel stampings in halves and welding these halves together by the resistance method. By this procedure great uniformity of product and light weight may be obtained and while retaining or improving the quality, articles so manufactured can be produced cheaper.

The resistance welding is distinguished from other welding processes in that it is used particularly for mass production of standard articles to be brought to welding machines to be welded, mostly by semi or total automatic means, excluding as much as possible the individual skill of the operator.

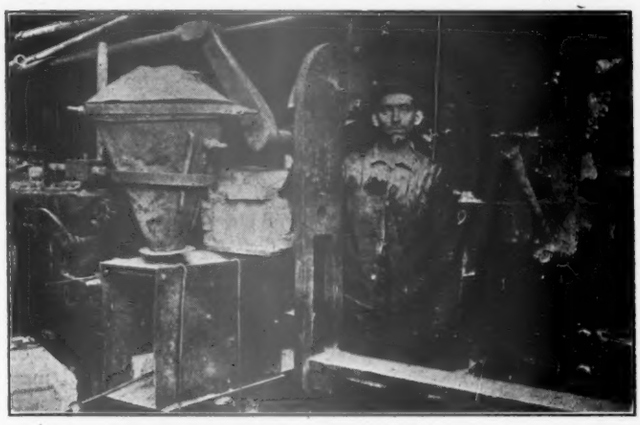
The range in size and composition of articles to be thus welded is very great. Wires as small as electric light filaments can be welded as a minimum. Iron or steel articles from 16 to 20 sq. in. cross section are successfully welded as a maximum, and the size and quality of product desired will determine whether it will be more economical to weld in a step-by-step fashion by a small amount of energy extended over a long time as in seam welding and spot welding, or to apply a large amount of energy over a great area for a short time only.

Thermit Welding

Thermit welding has a field of its own in the heavier steel and cast iron repairs, such as armature shafts, crankshafts, frames and heavy parts of machines, rolling mill pinions and rolls, locomotive frames, yokes, pedestals, etc., stern frames, rudder stocks and similar parts of vessels, street car rails, frogs and crossings, and pipe lines of 6 in. diameter or less.

Many of the railroad shops of the country are using thermit welding for the repair of their locomotive side frames, guide yokes, etc., and this probably is thermit welding's largest field. The frames run from the smaller ones (say, 4 in. x 4 in.) to heavy sections 8 in. x 8 in., and when the fracture has been made accessible, a repair of this kind can easily be completed in an eight-hour day. Usually, the repair can be made without the removal of any parts of the locomotive unless these are quite close to the fracture; and the locomotive is, therefore, repaired and returned to service in a minimum length of time.

Railroad shops have also extended the application of thermit welding to the remodeling of locomotives, welding in heavier pieces to replace parts of frames which have



Thermit Welding Applied to a Locomotive Frame. The Crucible and Mold Are Shown at the Left and the Finished Weld at the Right

proven weak, or welding extensions on frames where the design of leading truck or cylinder support is to be changed. One railroad, for instance, having found that its Santa Fe type of locomotive developed a weakness in a certain part of the heavy side frames, took all of its locomotives of this class, cut through the frame at this point of weakness and thermit welded this point in a way to re-enforce the frame.

The growth of thermit welding in the street railway field has been very marked, and has attracted widespread attention. By means of thermit welding, the maintenance of way departments have thermit welded the street railway tracks, making the rails continuous and eliminating most of the troubles due to joints. Street railways also use the thermit weld in the construction of frogs and switches made by setting up rails, cut and formed to the proper length and

shape, and thermit welding the intersections. Thermit welding is also used by the rolling stock departments of street railways for the repair of truck frames, motor cases and similar work.

Most people are probably familiar with some of the numerous thermit repairs made in industrial plants and steel mills, such as, for instance, the replacement of broken teeth in large steel pinions, or the repair of worn or broken roll necks, pods, the repair of broken machine parts, such as crankshafts, cast iron or steel machine frames, etc. This thermit welding work in the steel mills and larger industries is usually handled by their own welding departments in the regular course of the work, but many of the smaller plants have these repairs made in outside shops equipped for thermit welding, and in these shops repairs are made of numerous press frames, armature shafts and crankshafts varying in size from small pieces weighing 100 lb. or so to large press heads and similar parts weighing 30 to 40 tons. All of this work is usually of an emergency nature and such welding shops are usually prepared to work night and day.

Thermit welding has found a very broad field in ship repair work on account of the very frequent occurrences of broken stern shoes, stern frames, etc. These sections are usually either forged steel or cast steel, and although some of the lighter ones on tugboats and small craft may be 2 in. x 4 in. in section, the frames of such large ships as the "Resolute" and the "President Arthur" recently repaired were about 10 in. x 15 in. in section.

The welding of pipes or tubes by means of thermit is an application quite different from the ordinary thermit weld. In the performance of this work, the ends of the pipe are faced and butted together with a clamp on each. Two turnbuckles or screws are provided so as to enable the operator to draw these clamps and, therefore, the pipe ends tightly together. The joint is then surrounded with a simple, two-part, cast-iron mold, an amount of thermit reacted in a flat bottom crucible and immediately after reaction the molten mass poured into the mold. This molten mass surrounds the pipe at the joint, and within a minute or so brings this pipe to a welding heat, when the operator tightens on the screws or turnbuckles, forcing the pipes together about ⅛ in. and thus causing a strong butt-weld at the joint. Upon removal of the clamp and mold, the solidified thermit steel and slag drops away from the pipe and the weld is completed. Such pipe welds invariably test stronger than the pipe itself because the metal is upset slightly at the joint and the section is, therefore, heavier. This upsetting, however, is all outward so that the interior of the pipe remains straight and smooth, and in no way is the flow of air or liquids through the pipe restricted. Pipes thus welded may be formed or coiled, and all of the trouble from the usual threaded joint and fitting eliminated.

Station Men and Fire Prevention

By William S. Wollner
Fire Prevention Agent, Northwestern Pacific

WHEN RAILROAD BUILDINGS have been constructed with as few fire hazards as possible and have been adequately equipped with fire fighting apparatus, it may be assumed that the work of the fire prevention engineer is completed; but station buildings which are located in places inaccessible to public fire fighting equipment, and are seldom visited by the representatives of Underwriters' Inspection Bureaus, demand special attention. The station agent's interest in fire prevention matters is rarely aroused and he usually has the impression that the fire prevention department, and not he, is responsible for the removal of hazards and the maintenance of fire fighting equipment.

Several years ago the Northwestern Pacific instituted a plan for the semi-annual inspection of station buildings, the inspections falling in the early fall and the early spring. The fall inspection was directed particularly toward the detecting of hazards in heating and lighting apparatus, and the spring inspection toward the discovery and elimination of the special hazards of summer, and the providing of adequate fire fighting protection. But such inspections are liable to become more or less perfunctory, and the Northwestern Pacific has attempted to interest all its employees, and particularly those in station service, in the value of fire prevention and preparedness to handle the situation if a fire should occur. The bulletins of the National Board of Fire Underwriters and the National and Railway Fire Protection Associations have been used for this purpose.

This fall it was decided to institute a "self-inspection" of station premises, by agents, in order to interest station forces and educate them as to fire hazards and what constitutes adequate protection. The railroad company's Fire Prevention Department prepared a questionnaire covering nineteen points, as listed under four headings, below. The first three divisions dealt with the special winter hazards, and the last with all-year-round hazards. The questionnaire follows:

NORTHWESTERN PACIFIC RAILROAD COMPANY

Fire Prevention Inspection of Depot at.....

Date.....

.....Inspector

Stoves—

1 Are stoves firmly mounted on metal or other incombustible material and is there at least four inches of air space between it and the bottom of stove?
2 Are stoves at least three feet from woodwork or walls, or are they not less than eighteen inches from walls or woodwork with metal shield and air space?
3 Is stovepipe firmly connected to stove and chimney and securely braced?
4 Where stovepipes pass through walls, ceiling, or roof, are they guarded by ventilated collars at least one-and-one-half times their diameters?
5 Are ashes kept in an incombustible receptacle?

Electric Lighting—

6 Are wires well strung and free from contact with uninsulated surfaces or objects?
7 Are all fuses in place?
8 Are pendant lamp cords in good condition and not supported by nails, wires, etc.
9 Are lamps free of inflammable shades?

Kerosene Lighting—

10 Are all lamp fonts of metal?
11 Are lamps filled and oil stored at metal-covered tables?
12 Are all lamps free of the possibility of curtains, etc., blowing against them?
13 Are lamps free of inflammable shades?
14 Are lamps used for going into record rooms or other confined spaces?

General—

15 Are *all* matches kept in a metal box?
16 Have extinguishers been filled within a year?
17 Is hose ready for use?
18 Are barrels filled and buckets in place?
19 Is "housekeeping" good?

The questionnaire was sent with a letter signed by the Fire Prevention Engineer to 65 agents. The letter told why the matter was being handled as a "self-inspection" this year instead of being taken care of by the regular inspector as formerly. The agents were asked to answer Yes or No to each of the 19 questions and to give any further data considered desirable.

The questionnaires were mailed November 14 and most of them were returned on the train following that on which they were received. Forty-three were returned, properly filled out, within two days. On November 20, but seven reports had failed to arrive.

In answering questions No. 1 and No. 2 most of the agents were not content with saying Yes or No, but added actual measurements in feet and inches. Many agents noted whether electric fuses were plug or cartridge, and there was much additional data showing that the agents had not merely answered the questionnaire because they had been asked to. Many agents took advantage of the invitation to give additional data on the reverse side. A questionnaire similarly prepared for summer hazards will be sent to the agents in the spring, but hereafter, duplicate blanks will be sent so that one copy may be kept on file at the station.

Freight Car Distribution in the United States

Statement of Case for Present Car Distribution as Against Warfield Plan

By L. M. Betts*

Manager Open Top Car Section, Car Service Division, American Railway Association

EVER SINCE RAILROADS began to exchange freight car equipment there has been growing up by degrees and through varied modifications a set of so-called car service rules which regulate the relations between railroads in connection with the use of each other's freight equipment. These regulations began upon the premise that each railroad purchasing equipment was entitled to its full use consistent with the requirements of commerce and the obligation of the owner with respect to through routes. At times it has seemed that this principle was a somewhat unattainable ideal, but after passing through many vicissitudes, including the period of federal control when individual ownership was ignored and cars handled in a general pool, I believe I can safely say that today the principle is more firmly established and more generally accepted both among practical railroad operating men and among shippers, than ever before. I may add further that never before has this subject been given more careful study and consideration by the patrons of the railroads than during the past year, and this is a development most heartily welcomed by the railroads and by the Car Service Division.

The problem of car distribution is greatly complicated by the fact that, as you all know, the loaded traffic both for open and closed cars does not run equally in all directions; therefore, it is necessary to have some regulation that will restore the balance of equipment in originating territory and prevent accumulations of cars in destination territory.

The problem in connection with open cars, as a general thing, is somewhat simplified by the fact that coal, the preponderant traffic, originates in definite localities, and while in some instances there is a compensating return loaded movement, in the majority of cases the problem is merely to get the cars back in sufficient volume to protect the current production at the coal mines. Even in the case of sand, gravel, ore, and many other commodities requiring open cars, the points of origin are generally grouped in certain localities and the field of distribution adjacent thereto is more or less definitely limited. In the same connection, the production of steel shapes requiring this class of equipment is mostly centered in certain definite areas.

In the case of stock cars and refrigerators, somewhat similar conditions exist, but box cars present a peculiar and more complicated problem. This class of equipment is in universal use in all parts of the country, although the preponderant traffic varies in different sections, depending upon whether the chief interest lies in manufacturing, agriculture, lumbering, etc. To a certain extent, also, although all box cars are similar, there is a variation in the class of cars required to protect these different commodities. For instance, many box cars that are entirely suitable for manufactured products and most grades of lumber are entirely unsatisfactory for consignments of bulk grain which must have a car of rigid construction and absolutely without broken lining or defective sides and ends.

As a consequence of these conditions there are not only structural differences in the cars purchased by roads in different sections of the country, but there are also varying standards of car maintenance. As an inevitable result of these conditions and the operation of railroads under separate private management, it is obvious that the best results in the way of car maintenance are obtained by confining equipment to the fullest practicable extent to the service of the owner; in fact, experience proves it the only practicable method.

Box car distribution must also take into account the unbalanced loaded traffic already referred to. Bulky raw materials, such as grain, cotton, lumber, ore, etc., move in volume from the West, South and from Canada to the industrial centers, chiefly in New England and the states bordering on the Great Lakes. Return traffic in manufactured articles, steel, iron and merchandise is in concentrated form and requires fewer cars.

It will be seen, therefore, that maintenance of proper car supply in the originating districts makes *inevitable a constant and liberal empty movement,* and requires a *consistent, systematic* and *automatic* method of car handling.

The answer to this lies in the car service rules. A reasonable enforcement, in line with the flexibility therein provided, both as to the employment of the individual units and also as to the authority of the Car Service Division to suspend or permit general departure from certain specific rules in cases of emergency, will automatically and regularly maintain that balance between districts so essential to proper car supply.

When the railroads were returned by the government, after federal control, on March 1, 1920, there were only 11.5 per cent of the box cars of the country on home lines. During the ensuing eight months, in spite of the fact that the Car Service Division was obliged to make fleet movements of box cars into western territory, regardless of ownership, the ratio increased to 20.9 per cent. Subsequently, with the serious slump in business reflected in car demand, the cars went home in large volume, and on July 1, 1921, 65.2 per cent of box cars were on home roads. This was not an unfavorable condition in view of the fact, as heretofore suggested, that the equipment is bound to be given the necessary overhauling and repairs in a much more comprehensive way when in owners' possession. During the ensuing year, with comparatively light car demands, conditions did not change materially, the ratio on July 1, 1922, being 56.2 per cent. As a consequence, however, of the disturbing effect of the shop strike and a marked increase in car loadings, it was not possible to maintain current relocation of cars, and this, together with the severe winter in the eastern states which followed, resulted in the ratio of box cars on home lines reaching 32 per cent in November and 34 per cent on April 15 of this year. As of the same date, the roads in the Western originating territory had only 82.2 per cent of all box cars on line to ownership with the prospect facing them of extremely heavy demands for this class of equipment. Figures covering anticipated requirements furnished by the regional advisory boards in the West clearly indicated the necessity for relief measures. This condition might have been met, as in 1920, by orders to move box cars, regardless of ownership, arbitrarily into the western states, which would have further disorganized the relationships between railroads as to equipment in their possession and would not have fur-

*From an address before the Traffic Club of Wheeling, W. Va., on November 6, 1923.

nished the kind of cars required in the grain states. Instead of doing this the railroads were called together and specific instructions in line with car service rules were agreed upon applying to western ownership box cars, and as a result in the ensuing four months there was an increase on western railroads of 85,000 box cars and the number of home box cars on home roads in the three western districts increased by 100,000. During the most of this period the number of western box cars delivered in home route empty through the gateways at Chicago, Peoria and St. Louis averaged one thousand per day. This restored a normal situation on the western lines, giving them, as of August 15, 100.6 per cent of their ownership of box cars in their possession without at the same time causing any car shortage or unfavorable operating conditions on the eastern or southern roads making this westbound movement. As a result, there has been absolutely no shortage of box cars for agricultural products this year.

This favorable condition has been maintained, as is indicated by the statement comparing the ratio of box cars on line to ownership as of October 1 for the past seven years. This shows the most equitable distribution of cars between different sections of the country that has existed at any time during the entire period, and there has been avoided any accumulation of cars in the eastern states, an accumulation which is of no benefit to shippers in that section because it usually represents nothing more than cars standing still that ought to be in the process of distribution.

Summarizing, then, the entire record of the year 1923 from a car distribution standpoint:

1—Car loadings have greatly exceeded all previous records.

2—There has been no car shortage or freight accumulation of moment in any part of the country, and a consistently increasing margin of surplus cars has been maintained in the face of ascending car demands.

3—An extraordinary relocation of box cars has been accomplished equalizing car balances to the most equitable figure ever attained at the season of peak demand.

4—The eastern and southern territory, which contributed most heavily to the empty box car movement, shows a more favorable increase in traffic than any other territory.

5—These results have been accomplished in an orderly manner and in close harmony with the technical requirements of the car service rules, as indicated by current checks of railroad performances.

Such facts point inevitably to these conclusions:

(a) The car service rules are eminently practicable;

(b) They do not handicap commerce; and

(c) Their enforcement insures a fair and equitable distribution of equipment between different sections of the country.

Warfield Pooling Plan

A great deal of discussion concerning methods of car handling has been induced by proponents of the so-called Warfield plan of car pooling. Extravagant claims are made as to the saving which would accrue, particularly in connection with empty mileage that they assume would be avoided by the adoption of this theory of car handling. While the pool idea is somewhat new in public discussion, let me emphasize the point that it is one which has been debated by railroad transportation officers for the past twenty years without ever arriving at a practicable detailed conclusion, and the arguments now advanced before public bodies are the same old specious buncombe that has been discredited, not only in argument but also in actual experience under federal control. With a wide acquaintance with railroad transportation men in all parts of the country, I believe myself entirely safe in asserting that there is not an outstanding individual in the lot who gives the slightest credence to the proposition as now presented. Certainly, these men who have made a life study of such questions would be the first to favor any plan that will actually increase operating net revenue. Railroad operating results this year speak for themselves; it would be the height of folly for the public or the railroads to swap this actual accomplishment for the intangible and unproved claims of those engaged in this stupendous promotion.

For promotion it is pure and simple. It would be well for a close analysis to be made of the purposes and possibilities of the proposed federal charter. In the latest appearance of that statistical wizard, my old friend, Vice-President Ballantine, of the National Railway Service Corporation, out at Sioux City, Iowa, he dismissed the magnificent record of the railroads this current year with a gesture as a combination of fortunate circumstances, and with a mighty jingle of that stage money, which is so much their stock in trade, proceeds to an audacious attempt to purchase public support by a promise of a substantial reduction in freight rates if the Warfield plan is adopted.

When requested by one of his auditors to specify in greater detail how the alleged saving—which was ninety-two millions a year in one connection and fifty thousand a day in another, would be accomplished, particularly as to how his plan of car distribution would be made effective, he pleaded the necessity of working out these details *after* Mr. Warfield obtained his federal charter.

This plan of procedure inevitably calls to mind the old "Punch and Judy" game that was pulled off in a less sophisticated age by traveling charlatans, one of whom displayed the puppets to the open-mouthed gaze of the countrymen, while his unrecognized confederate worked the crowd for their valuables. Mr. Ballantine is displaying some very attractive puppets and putting marvelous promises in their mouths; let us beware lest in our interest in this entertainment we fail to protect a very substantial and valuable possession we now have, one which certainly has been tried and proved equal to a hitherto unattained task.

The great need today in the discussion of railroad matters is a clear conception of the actual facts of the situation, and the grave danger is the adoption of conclusions based upon insufficient evidence or upon irresponsible and reckless statements of political demagogues on one hand and economic theorists and selfish interests on the other. The railroads are trying to do an honest day's work for an honest day's pay and the rates charged should and must bear an exact relationship to the expense of furnishing the service rendered. With infinite regulation of every detail of their service, with absolute publicity on every angle of their operation and with the utmost desire that their patrons shall have an accurate insight into every item of interest in connection with their mutual relations, it is impossible to conceive of much opportunity for the railroads to get away with anything that is not coming to them. They have gone forward this year in good faith, translating improved earnings into improved transportation facilities as rapidly as the money can be spent. Not only will there be over a billion dollars expended for capital improvements during 1923, but the actual current outlay for material, wages and supplies this year will be not less than five billion dollars. To express some idea of its magnitude, this distribution alone is equal to $1.27 for every second of time since the signing of the Declaration of Independence. Probably more than any other single factor this enormous expenditure has contributed to the revival of prosperity of industry and agriculture in this country. Not because of the magnitude of its operation, but because of its supreme importance to the country as a whole, to you and to me, it is vital that these issues of railroad transportation shall be settled in a fair, honest and impartial way.

Through our regional advisory boards we have encouraged the shippers to become partners of the railroads in operating matters. We need more participation of this kind. We need more partners and fewer creditors in our financial relations.

Certain Illusions as to Great Leaders

It Is Not Always Wise to Place Too Great Reliance on So-Called "Principles of Success"

By Charles Weiss

SCIENTIFIC MANAGEMENT, industrial organization and human efficiency have in recent years come in for endless study. Almost everyone in the railroad world is more or less interested in the application of these studies. Much has and is being written for the purpose of promoting progress, by recounting what has been accomplished along certain lines and in certain places. Very often too much attention is paid to pointing out as examples what isolated individuals have achieved. In most cases the individuals referred to are not types that the ordinary man can follow in practice, but rare specimens, like Andrew Carnegie or Henry Ford. With all due respect to the ability and the value of such leaders their methods can hardly be followed by the average official. Being hero worshippers, most people are interested in reading about such men. This insatiable demand for information concerning the great and near-great accounts for the supply of such news. It must indeed be admitted that the study of great men is a valuable tonic and inspires the ordinary human being with somewhat more ambition and energy than he might otherwise possess. When, however, it leads to dreamy flights and shooting at distant stars, such study should be tempered with a few of the prosaic actualities of every-day conditions.

Keep Your Feet on the Ground

In our railroad organizations, just as in all other industries, only a very limited few can aspire to heights of great leadership, as represented by the president or the general manager. The road to these positions is, of course, open to all and at present it is known that most of our railroad officers of the highest rank started at the bottom. There is, however, very little room at the top and the aspirant must run a gauntlet of many difficulties and handicaps in competition with multitudes of others before he can hope to even approach it. The average, in fact the vast majority of supervisory officials, will be benefited much more by modifying what they are told about the Goulds and the Harrimans than by trying to follow them blindly. To do so should not detract from any man's enthusiasm or interest, but should merely serve to keep his feet on the ground.

The so-called "secrets of success" of the Napoleons of transportation and industry are not wholly applicable to any but a very select few. To emulate the examples of such peculiarly situated individuals would in most cases lead to ridicule or failure. Qualities of leadership and management are not cold, mathematical substances but rather very general principles which must be modified for each man. Furthermore the popular accounts of the professional habits of these widely-heralded leaders must also be taken with a grain of salt. Too often some writer, with little else than his literary ability and imagination, has dissected his subject psychologically and ascribed certain qualities which he establishes as the cause of the man's success. He then proceeds to hold these qualities up for absorption by his readers.

In order to correct some existing misapprehensions regarding these secrets, keys or qualities of superiority, several of the most commonly described will be analyzed in some detail. Perhaps the most widely discussed is the ability to avoid details and concentrate upon the bigger problems. We are thus told of Henry Ford's remarkable organization and how he can immediately call in some subordinate who will give him an expert opinion upon any subject likely to be presented to him. In this manner he is supposed to be able to keep his mind free of the unimportant trifles and devote himself to the more important matters.

Value of Personal Contact

This push-button system is admirable for a man in control of the tremendous forces that Mr. Ford dominates, but it would be out of the question for any railroad executive. It means not only great expense in itself but robs the organization of expert consideration by its supposedly most capable official. For example, a trainmaster who would be satisfied to sit at his desk and go over the various reports dealing with train movements, detentions, car records, etc., and give directions to subordinates for the improvement of the items below standard, would be a failure. Admitted that he has more territory than he can cover in a day and that there are many other questions of operation, discipline, accidents and what not, which he must answer, he must go into greater detail than merely study reports. Making full allowance for the confidence which he must place in his assistants, he must nevertheless go into the fullest details of the operation under his jurisdiction.

He must not only ask, "Why," and then be satisfied with a plausible answer, but should devote at least one full day a week to actual observation on the ground. This need not be at one stretch but rather a few hours at a time spent at a yard office, or wherever things are not exactly going right, watching everything that takes place and then questioning the procedure. In this manner he will uncover many leaks and discover good points that can be applied over the entire division. Attention to detail in this way automatically solves details at other points and the personal contact with the yardmasters, clerks and even call-boys will spur them on to greater effort.

The road foreman of engines, in a similar manner, must delve into apparently petty details. He should not try to run every assistant's job, but he should spend part of his time around engine houses and so compare the different ones by actual observation. He should go over the road on engines, freight and passenger. He will learn many things he did not understand before. His engine crews will make their locomotive go over the road with a heartier effort for a superior of that type.

Many division engineers and even roadmasters try to follow the push-button habit, by limiting their supervision to riding the rear-end of trains and throwing notes off to foremen, calling attention to defects in track or roadway. Their idea of attending to details is to point out the trouble and let the other man fix it according to his own methods. Their own function they believe is to get results, which to them means having someone else do the work. Maintenance officials can get far better results by spending a few hours, at least every week, walking over the track with the foremen. They can meet three or four foremen in that time and by walking along, notice many things of mutual benefit. They can talk of what the gang is doing, what the foreman is planning to do next, how he is planning his season's work, how he applies different material, uses tools, and what not.

Such procedure will arouse the foreman's interest and as far as the higher official is concerned he will have greater knowledge of what is going on.

The fact is that any individual trained along certain lines can suggest improvement in a similar line at some strange point, even to another man who has been in charge of that place for a long time. The division engineer or supervisor, with his wider activity, is therefore especially situated to do this. The danger of training one's self to pass the details along to someone else is that this habit expands itself and the individual gradually places more and more of his work in the detail class. After a time he is so completely out of touch with the important details that he is really incompetent to consider and decide upon the broader phases of his office.

Very few railroad men can afford to ignore details. The successful ones consider nothing too trivial to be overlooked, up to the limit of their capacity. There are men in important positions in other industries who have swallowed the theory of avoiding details, hook, line and sinker. To them it is very convenient for it permits them to devote their energy to such big problems as golf or other sports. Such a type is rare in the railroad world, however. It is also rare among the really big men who are accomplishing things worth while. They will subscribe to the doctrine, "Blessed be drudgery."

Another of the qualities ascribed to the successful man is the ability to reach a decision quickly. This has also been misapplied in many cases. Vaccilation is a dangerous habit and the fear of appearing so drives many capable men to sudden conclusions that are wrong and not worthy of their best thinking. They think that unless they promptly say, yes or no, to the biggest questions they will be considered mentally slow or inefficient. They have been imbued with the idea that the Vanderbilts and Hills are in possession of some canny instinct which makes it possible for them instantly to see both sides of complicated problems. Wishing to appear likewise, they insist upon passing snap judgment upon matters requiring deep study.

Such men are common and they have sadly misinterpreted one of the established "principles of success." The railroad officers who have reached pre-eminence are known to ponder upon every big question that comes before them. They do not accept blindly the opinions and reports of others, but get to the bottom of it themselves. They are indeed prompt in coming to a decision, because they are able to coolly consider the different aspects of a proposition, carefully and skillfully balance both sides, and waste no time hesitating. They make haste slowly and in the end are usually right. The man who has logically considered a problem and reached a conclusion accordingly is usually firm in his decision. The one who is outwardly confident, but inwardly uncertain can be moved from his position more readily.

Surrounded With Specialists

Still another of the characteristics of the Schwabs and Rockefellers is the ability to surround themselves with capable assistants. Given the resources, almost anyone could go into the market and engage leaders in any kind of work. In the railroad organizations no such possibility would be found. Railroad men require much service to be trained. The head of a department cannot go out and engage a personnel that would reorganize the system. He must choose from the comparatively few who are already available, by position and experience. He can, however, do much to overcome the weakness of a staff that is thrust upon him.

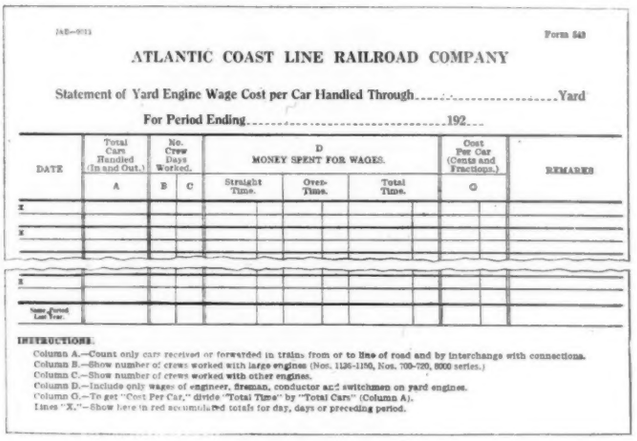
In the first place he must realize that his organization will be a distinct reflection of himself. If he is thorough and hard-working it will be likewise. If he is loyal, honest and ready to help his men they will be likewise to him. By application of the ordinary rules of handling men he can improve any given personnel. He can increase their loyalty, their productivity and their efficiency. Picking the right man is only the first part of the task; training him and handling him is even a bigger undertaking.

The man who tries to be guided by the performance of a Gary will go wrong unless he adapts the principles of Mr. Gary's success to his own conditions. It is commendable to try or to hope to be president of a railroad, but it is far more practicable to consider more carefully the possibilities and peculiarities of one's own position. For the ordinary man to try and apply what he believes the head of the corporation does is to try and fit a square plug into a round hole. No amount of twisting will get it in, and much energy will be saved by getting out a knife (a sharp one at that), and whittling away the corners.

Checking Yard Costs

A. C. L. FORM 543, "Statement of yard engine cost per car handled through yards," recently introduced on the Atlantic Coast Line is meant as a daily record showing in simple form cars handled, the number of crews worked, the wages paid and the resulting cost per car in yards.

Its purpose is to force the yard officer to know what results he is getting in wages paid per car handled; not only each day, but by days, cumulative until a half month has elapsed. Then the report is forwarded to the division office, there consolidated and finally sent to the system office for the information of the management.



ATLANTIC COAST LINE RAILROAD COMPANY

Statement of Yard Engine Wage Cost per Car Handled Through.....Yard

For Period Ending.....192...

DATE	Total Cars Handled (In and Out.) A	No. Crew Days Worked. B	C	D MONEY SPENT FOR WAGES. Straight Time.	Over-Time.	Total Time.	Cost Per Car (Cents and Fractions.) G	REMARKS
1								
2								
3								
15								
Same Period Last Year								

INSTRUCTIONS.

Column A.—Count only cars received or forwarded in trains from or to line of road and by interchange with connections.
Column B.—Show number of crews worked with large engines (Nos. 1126-1150, Nos. 700-720, 8000 series.)
Column C.—Show number of crews worked with other engines.
Column D.—Include only wages of engineer, fireman, conductor and switchmen on yard engines.
Column G.—To get "Cost Per Car," divide "Total Time" by "Total Cars" (Column A).
Lines "X."—Show here in red accumulated totals for day, days or preceding period.

A. C. L. Form 543—Statement of Yard Engine Wage Cost per Car Handled Through Yards. Full Size of Form Is 8½ in. by 11 in.

Its particular value lies in the fact that, since it is made up from day to day, there immediately shows in increased cost per car any falling off in business which is not accompanied by a reduction of crews in yard service. Thus the yard officer is able at the time the rising cost appears to take effective measures to hold his expense in line.

With such a form in use, the yardmaster's responsibility as to the number of crews he is permitted to work may be increased; with the understanding that he can work as few or as many as he likes, provided he keeps his costs down and the service up.

The form is compiled in the yard office of each terminal. The details as to wages are obtained from tables showing the wages paid to crews for eight hours of straight time and for each minute of overtime up to 60 minutes, the details as to cars from a count of switch lists and interchange reports. For this information, the *Railway Age* is indebted to J. L. White, superintendent transportation, Wilmington, N. C.

Economizing the Time of the Way Freight Train

Handling L. C. L. Freight to Reduce Overtime, Prevent Damage to Goods and Conserve Car Supply

By E. F. Ford
Freight Service Inspector, Chicago, Burlington & Quincy, Kansas City, Mo.

IT IS A FACT recognized by everyone familiar with handling freight that the less it is handled from point of origin the less the damage and the fewer the shortages. Tonnage surveys taken periodically at the principal transfer stations will keep the movement of carload merchandise properly regulated, giving it the most direct service, and which of course means minimum handling. It is the other class of merchandise that I am going to write about, the l. c. l. freight that is distributed from the peddler car.

We found that this class of freight and the system of peddling it involved an alarming number of shortages and bad orders; and a staggering amount of overtime was paid out to the way freight crews. Our claims were very heavy and were increasing; and when our claim investigation was complete, we were still in the dark as to what happened, each file telling practically the same story—that the car was worked at from one to 16 stations. But our investigators were still baffled as to what became of the shortage or how and by whom the damage was done.

Upon further study we found that the peddler cars were the principal cause of our trouble; and, that being true, we decided to abolish the peddlers by consolidating their freight at a centrally located transfer, into as many straight cars as tonnage would warrant. We accordingly took a survey of tonnage moving from the forwarding stations (five of them) being distributed in peddler cars to 16 country stations on a sub-division of about 100 miles.

This survey, taken from station received abstracts, for ten work days showed us that the peddlers were taking in some cases as long as four to five days to deliver freight to destination, by reason of way freight crews setting cars out at heavy stations, instead of unloading the freight.

The railroad was strewn with merchandise cars, worked and partly worked; and in addition to being opened at from 3 to 16 stations, these cars were exposed to pilferage, being left open at set-out points while still containing freight for points beyond; and a great deal of damage occurred by reason of train men failing to even down the cargo after working the car at each station; and by tramping over freight digging out packages not loaded in station order.

We figured if we could put this freight into the transfer daily, consolidate it and forward it the same night we should be giving a service superior in every way to the peddler car; and deliver each station's freight the second morning after leaving originating point. We accordingly started the consolidation at the transfer on March 23, 1921, on merchandise loaded at five forwarding stations.

Train 91 is the way freight which distributes this merchandise and its overtime for the last year of the peddler car method averaged consistently 4 hours and 47 minutes per day, a burden imposed by the necessity of the crew handling this package freight. The first 30 days after the consolidation plan was established and the set outs scheduled, the overtime of this same train averaged one hour 22 minutes a day, and the second 30 days one hour and nine minutes daily. Reliable records kept by our O. S. & D. bureau show from this change an outright decrease of 61 per cent in short reports and of 54 per cent in bad order reports.

Our general superintendent's office became impressed by the falling off in short and bad order reports and issued a questionnaire to some of our country stations asking them to what they attributed the showing. This gave the agents an opportunity to tell what they thought of our consolidated schedule. Our country station agent is a very accurate barometer by which to gage public opinion. If a service suits the people it suits the agent, whereas if it results in constant complaint the agent, guarding his own peace of mind, will have none of it. Of the replies the two quoted below are from agents at two of the principal stations and are typical of a number of replies received.

"The Ford plan of consolidating merchandise, together with the proper marking, checking and receipting for all shipments, has greatly aided in the reduction of bad orders, overs and shorts, and also has made a saving of an average of one hour a day in clerical work. Time is saved in investigating and settling our city claims; and also, the scheme leaves us with a better satisfied community."

The above was written by the agent at a county seat station handling a large amount of merchandise. Another one, at a similar station, says: "Since Inspector Ford established the consolidation of merchandise the plan is responsible for the great decrease in shorts and bad orders. The plan is wonderful and new advantages show up every few days."

The superintendent of the division in writing his comments upon the results under date of June 13, 1921, after watching it operate for three months, said: "The big saving

One Hundred Miles; Sixteen Stations

in overtime which you have succeeded in making on Train 91 certainly shows time and thought devoted to that problem, and I believe is greatly appreciated by the management."

This train No. 91, under the consolidated schedule, made a record run on May 22, 1921, leaving terminal D at 5:45 a. m., did regular work serving 16 stations and the crew were relieved at terminal E at 11:15 a. m.—covering a distance of slightly over 100 miles in 5 hours and 30 minutes—a record performance for a way freight train on this railroad.

Upon reaching the 12th station out, this train 91 used to back in at the house to let passenger train 43 by and to meet 4 and 14 and by reason of some peddler cars having been missed on previous days they would have a double set of such cars—sometimes 8 or 10—still in their train to be peddled at four good merchandise towns and a village still to be served westward. The crew would accordingly stage what was known locally as the "deck hands'" transfer—all hands from train, engine, station force and sometimes two or three hoboes would fall upon the freight in these 8 to 10 cars, dragging it from car to car making set-outs for points beyond. No pretense was ever made by the crew to check this transfer freight unless the inspector happened to be riding.

Their time at this station was two to three hours a day. Under our consolidated schedule their actual work at this station requires from five to ten minutes.

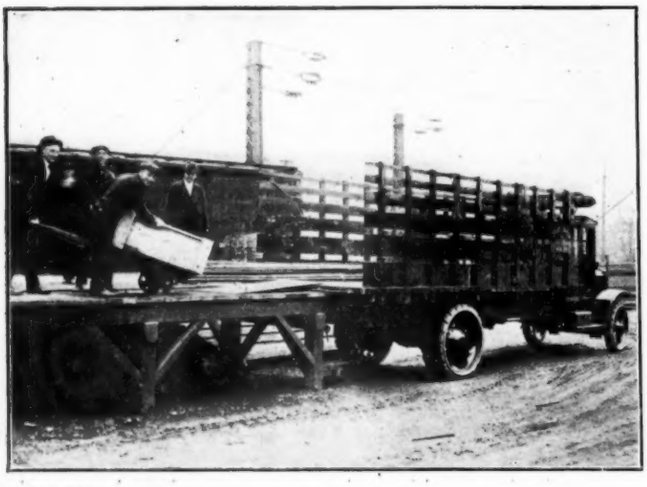
The first 60 days were taken to study the advantage of

the new plan, dispatchers keeping extra work off from No. 91 during this period. The success we had with 91, which transformed it from the slowest way freight on the division to the fastest, encouraged us to try and relieve No. 92—the way freight in the opposite direction—which had the same troubles, the peddlers being fewer, however. A survey and study of the tonnage involved revealed the fact that it could be consolidated at Station F and make really better time than by peddler car—but would require the addition of one freight handler to the station force. This was in April, 1921, when depression had reached its lowest point and retrenchment was the order; but we had no difficulty in securing authority to put this man on, guaranteeing the management we would dispense with his services at the end of 30 days if the reduction in overtime did not clearly justify the investment.

The 30-day period showed an outright saving of over $400 in overtime on train 92 after we had paid this man his salary. Organizing Station F into a transfer enabled us to provide for five small towns which did not have enough freight out of the consolidation in 91 to pair them off into set-out cars as we did with the balance of the stations; and we accordingly scheduled these five stations to be loaded in reverse station order in opposite end of car and carded the car to Station F in a through train daily. At Station F these five stations were built up with tonnage from the west which arrived during the night so when this car was picked up by 92 it contained consolidated freight destined to these five towns from nine different loading centers instead of being served by nine peddler cars as formerly.

Later on we extended the plan to cover the remainder of the division, using two other large stations as consolidation points, and entire success attended the venture. The project resulted on this one division in putting three way freight trains on newer and faster schedules, and figures taken from timekeepers' records show the saving in overtime as between $20,000 and $30,000 a year and a saving of 2,000 to 2,500 box-car days in a year.

Getting back for a moment to loss and damage of freight, I will quote from a letter from our general superintendent's office to a neighboring district commenting on the plan, as follows: "It would be hard to explain all of the advantages we are deriving. The monthly consolidated report of last packages which we issue by stations speaks for itself. At division O. S. & D. meetings, the agents in a number of cases have declared that their good showing is due entirely to the freight service inspector, who has worked out the consolidated scheme and keeps it regulated."



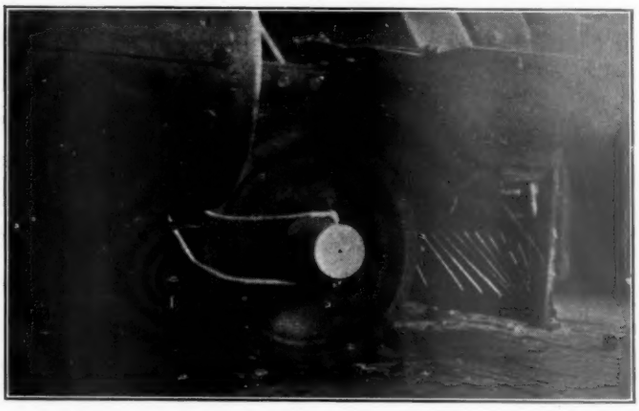
Wide World

One of the Motor Trucks Used by P. R. R. in Local Freight Service Between Wilmington and Philadelphia

Miller Train Control Corporation Develops Speed Apparatus

THE MILLER TRAIN CONTROL CORPORATION, Danville, Ill., has developed and had in service for nearly a year a speed control device which is designed to be used as an adjunct to its present automatic stop system of train control as operated on the Chicago & Eastern Illinois and in connection with the positive stop valve as approved by the Interstate Commerce Commission and described in the *Railway Age* of September 29, page 580. Speed control is obtained through the medium of a pressure or oil flow system. A steel flange is centered and bolted to the end of the axle of one of the truck wheels to carry a self-contained gear pump. This gear pump is housed in a dust-proof and weather-proof case, carried by the outer ring of a large ball bearing, the inner ring of which is securely attached to the steel hub on the axle. Two ⅜-in. pipes are carried from this pump back along the running board of the locomotive to a point adjacent to the cab where the speed control mechanism is located.

This mechanism consists of a suitable cam and latches to provide for the different functions. The travel of the



A Self-Contained Gear Pump Is Mounted on the End of the Pony Truck Axle

parts is obtained through the medium of a piston with an automatic metering valve through which a non-freezing fluid flows from the pump, and allows the piston to travel in an upward position in accordance with the speed and rate of flow of the fluid. This fluid overflows into a weather-proof case surrounding the piston mechanism which acts as a reservoir and from which it flows to the pipes, through the pump and then back to the cylinder underneath the movable piston.

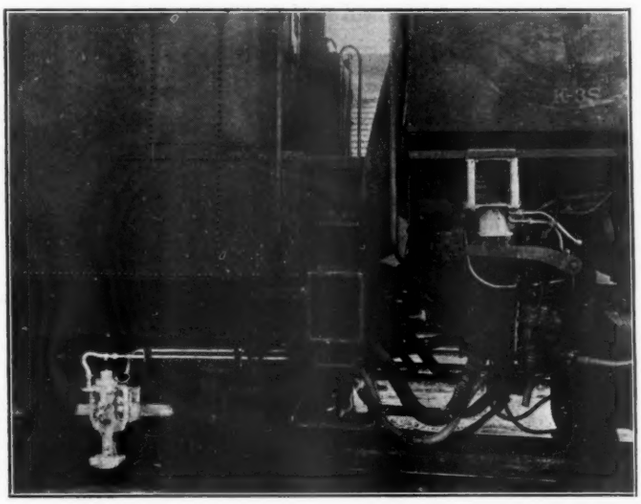
When the locomotive is standing still the apparatus is at its normal or zero position. As the locomotive is moved in either direction the fluid flows from the reservoir through the pipe and pump into the cylinder under the piston. As soon as the fluid begins to flow, the piston starts to move upward. Its total range of movement is approximately three inches. High or maximum speed restrictions, when used, are obtained when the piston has reached approximately the full length of its travel. However, the speed range is adjustable and no maximum speed limit need be provided unless desired. It is claimed that experience has shown that the operation of this piston is slow, positive and reliable.

As the piston moves upward it rotates a pair of disks mounted on a shaft. On the periphery of one of the disks a cam or ball is milled so that when the mechanism is in a position corresponding to a maximum speed set-up the cam comes in contact with a bell crank; as this crank is moved

outwardly the opposite end depresses a small automatic valve with a graduated port, which is connected to the train line. This causes an exhaust of train line pressure and applies the brakes. As soon as the train has slackened to a rate below the maximum speed the valve closes.

As the control instrument functions for a stop ramp, this reduces air pressure in a small pipe connection from the bottom of the control cylinder to a small cylinder in the speed control mechanism; a piston in the small cylinder sets out a cam between the disks and a latch drops into place, securely locking this cam, which is known as the medium speed cam. After the engineman has stopped for a red signal under this movement, he restores the positive stop valve and starts his train, but if he should attempt to run through a red block at a speed in excess of the prescribed medium speed, the governor applies the brakes by making a train line reduction. As soon as the train slackens, the little valve closes and the engine and train can proceed, but only under this limited speed. If another stop ramp is encountered in the interval it will again force the train to a stop and the cam mechanism will hold. As soon as the shoe engages a clear ramp, the cam mechanism in the governor releases and the train can then operate up to a maximum speed.

Where it is necessary or desirable to operate a train over a stop ramp in order to take a siding, in a following movement on grades with tonnage signals, or for cross-over movements at an interlocking plant, the engineman must first place his train under a low speed control, of, say, 15 m. p. h., and at the time of engaging the ramp he must operate a release lever which will prevent the control from giving a stop. This manual action on the part of the engineman will set out a slow speed cam, and if the engineman should



The Speed Control Apparatus Is Mounted Under the Cab

attempt to exceed this slow speed through the block, the governor will again function to make a brake application by reducing the train line pressure. It is claimed that in each of these operations the governor is so connected that it does not interfere with the fundamental part of the braking system; that it will cause no complications in installation or maintenance; and that it will operate with a minimum of attention, allowing the engineman to handle his train in accordance with rules and regulations, subject, of course, to the conditions set up by the train control mechanism.

As the governor functions at maximum speed, it will first notify the engineman (and in this way act as a speed indicator) that he is up to that high speed and unless he retards, the governor will apply his brakes. It will give him the same warning at 30 m. p. h., and it will give him a similar warning at 15 miles (or at whatever other medium and low speed limits may be selected by the railroad) when the shoe engages an energized ramp or a contact rail placed for the purpose at a siding, tunnel or bridge.

In order to comply with the government's specifications the positive stop valve was incorporated, which is simple and self-contained. When the control functions over a stop ramp this valve opens and requires a manual reset, and it has been necessary in the past for the engineman to descend to the ground to make this manual release. An electrical connection is provided through the speed control mechanism so that when the train comes to a stop or to a low speed, as may be determined, the engineman can push a button in the cab and reset the positive stop valve without leaving his seat; but no release is effected if the button is pushed at higher speeds. There is no way in which he can lock the positive stop valve and push the button at any time except when the train is stopped or practically stopped.

If, for any reason, this mechanism should get out of order, it is designed to fail on the safe side. The speed control and cab release mechanism can be applied to any type of steam or electric locomotive. It does not interfere in any way with the normal and safe operation of the Miller train control device as in service on the Chicago & Eastern Illinois, or in the handling of the locomotives on the road. It is claimed for this development that it has no complicated electrical circuits or delicate mechanism, and that the engine can be operated in non-controlled territory without cutting out any of this mechanism. If it is desired, the high speed feature may still be operative in non-train-control territory, as this is automatic in its operation whether the track is equipped with train control or not. The same inspectors and mechanics that inspect the air brakes or do the regular roundhouse work can maintain this mechanism as it has been designed and built with that object in view.

Value for Rate Making

By H. T. A.

THERE HAS BEEN a great deal of discussion as to the proper principles to be used in finding the value of the railroads. The reason that definite principles have not been agreed upon is because certain unsound premises have been used from the beginning of federal valuation and they have persisted in the framing and administration of the transportation act.

First: The transportation act proposes to convert a profit-making business to a service-at-cost basis.

Second: The transportation act provides for fair return for groups of roads and different rates of return for individual roads, if the valuations as now being made are used.

The first proposition affects the basis upon which the value of the roads as a whole is determined. The railroads are established under the law, to carry on a profit-making business and they cannot be converted to any other basis if such conversion confiscates property.

It should be stated here that this discussion is not primarily concerned with the question of confiscation of railroad property, but with the fact that the values which are being stated by the Interstate Commerce Commission, and the return which is proposed under the transportation act, are arrived at through reasoning which is logically unsound.

No Direct Relation Between Cost and Value

Under conditions of competitive business for profits there is no direct relation between the cost to build a railroad and its value to its owners. Its value depends upon earnings.

Every privately owned railroad is built with the expectation of earning at least a fair return upon the capital investment. If the least favorably situated road in a competitive

group earns a fair return upon its investment, the more favorably situated roads must earn a higher return. Therefore, if the just expectations of the owners were realized, the aggregate business value (capitalized earnings) of the roads in a competitive group would be the aggregate capital investment of all roads in the group, plus the excess of business value over capital investment, for the more favorably situated roads. This may be considered minimum normal business value.

Competition and Business Value

Competition lowered business value below this normal minimum. Competition can reduce business value because the amount a property must earn to continue in business is that amount necessary to pay operating expenses and current renewals. It is therefore possible for a railroad to continue in business on earnings which are very much less than those required to pay a fair return upon its value.

In order to attract business a favorably situated road may establish rates, profitable to itself and to other favorably situated roads, but which are unprofitable to the unfavorably situated roads. The unfavorably situated roads can do nothing but accept the rates established by the favorably situated roads and continue in business as long as the rates yield a return sufficient to pay operating expenses and cost of current renewals. The effect of this pressure of competition is to reduce earnings for the group, and therefore reduce business value. Permanent property of unfavorably situated roads may be, in effect, consumed in public service and lost to the owners, and business value may be lost to the owners of favorably situated roads. Competition has, to a degree, had this effect upon the railroads of the United States and regulation has held down or reduced rates which were, in the aggregate, already unprofitable.

The business value of the railroads (roughly, their value as represented by New York stock exchange prices) has for years been several billions of dollars less than the amount of money actually invested for the properties, as shown by the railroads' investment accounts.

It is understood that the stock exchange prices are subject to variations due to interest rates, general business conditions, popular beliefs as to future prospects for the roads and numerous factors that do not relate to real business value. The investment accounts of the railroads are also open to criticism. But everyone conversant with the facts knows that the business value of the roads is, and for many years has been, below the correct amount for investment account.

It may be a matter of business expediency to assume that these losses cannot be restored above the amount that may be considered proper for the service-at-cost basis. It is believed that this amount is the property invested for public use as of the time it is converted to service-at-cost basis. In determining this amount, difficult questions arise as to pricing dates, treatment to be accorded depreciation, and numerous other matters, but their solution follows from the premise taken and it should be possible for all interested parties to agree upon them if the premise is granted and it should be possible for them to agree upon the premise if it is sound.

Valuation on service-at-cost basis will mean the loss of billions of dollars of business value that would have accrued to the roads if it had not been lost through competition and regulation, but it will also yield a value several billions above the level of actual business value in recent years, and many opponents of the roads believe, as many railroad men believe, that it would be possible to force the roads into a less advantageous position.

The Matter of a Fair Return

The second proposition affects the basis upon which the value of an individual road is determined.

The transportation act provides, "* * * carriers as a whole (or as a whole in * * * rate groups * * *) will earn, * * * as nearly as may be, a fair return upon the aggregate value of the railway property of such carriers." (The actual return since the passage of the transportation act has been considerably below what the Interstate Commerce Commission itself has determined upon as the fair return.)

And it also provides, "Inasmuch as it is impossible (without regulation and control in the interest of the commerce of the United States considered as a whole) to establish uniform rates upon competitive traffic which will adequately sustain all carriers * * * without enabling some of such carriers to receive net railway operating income substantially and unreasonably in excess of a fair return upon their railway property * * * any carrier which receives an income so in excess of a fair return, shall hold such part of the excess, as hereinafter prescribed, as trustee for, and shall pay it to, the United States."

In other words, the total net income for a rate making group shall be a "fair return" upon the "aggregate value" of the group but part of that net income shall be paid to the government. Therefore the amount retained by the group shall be less than a "fair return."

This confiscation of income results from alloting values to individual roads on the basis of investment (the commission's estimate of "final value").

Investment and value may be the same amount for a rate making group (if that is the premise), but investment and value cannot, except by chance, be the same amount for an individual road, because value depends upon earning and not upon investment.

A Wrong Valuation for Every Railroad

This is a matter of simple mathematics and to proceed upon the principle that value of individual roads depends upon investment will result in a wrong valuation for every railroad. The effect is to allot relatively high "final values" to unfavorably situated roads (roads whose ratio of net earnings to investment is low) and relatively low "final values" to favorably situated roads (roads whose ratio of net earnings to investment is high).

"Rate making value" is an amount of money upon which "fair return" is computed.

"Fair return" is computed upon the "aggregate value" of a rate making group. This "aggregate value" is the first "rate making value" that can be found. It is the "value" of the rate making group.

The relation of "fair return" to "value" is the same for an individual road as for a rate making group, and "fair return" is, "as nearly as may be," "net railway operating income." Therefore, the relation of "net income" to "value" is the same for an individual road as for a rate making group and it follows that the "value" of an individual road bears the same relation to the "value" of its rate making group as the "net income" of the individual road bears to the "net income" of the group.

This may seem difficult and indefinite and it might be argued that since this method is not precise, some precise method should be found. The facts are, that under the limitations set by the elements entering the problem, it is mathematically impossible to state the precise value of an individual road. Its value must be estimated, by taking account of its relation to its rate group.

It is not claimed that the method outlined above should be used to find the value of individual roads (in fact it is difficult to see why the "value" of individual roads is needed at all), but it is claimed that the problem must be correctly stated, and that the reasoning must be logical and mathematically sound if any satisfactory conclusions are to be reached.

The Transportation of Perishable Freight

How Railroads Handle This Important Traffic and Some of the Problems Which It Imposes

THE SCOPE of the business of handling perishable freight in the United States and Canada, and the manner in which the railroads meet the exacting requirements of this important traffic, was the subject of two informative articles presented before the Western Society of Engineers on Monday evening, October 15. G. H. Nelson, manager, refrigerator department of the Atchison, Topeka & Santa Fe, outlined the requirements of the perishable freight traffic and the manner in which the railroads meet them. J. W. Inghram, chief engineer of the Railways Ice Company, described the development of the art of refrigeration and explained the operation of icing stations. These two papers are abstracted below:

How the Railroads Handle Perishable Freight

By G. H. Nelson

Manager, Refrigerator Department, Atchison, Topeka & Santa Fe, Topeka, Kan.

The growth in the consumption of fresh fruits and vegetables has reached such proportions that it is now a necessity to place upon the tables of all of the people at all seasons of the year, the product of any part of the United States, Canada and Mexico, the movement being almost entirely by rail transportation and interchangeable according to the season and the point of production. In order that this may be successfully accomplished, the goods must be placed in the hands of the consumer in a wholesome and sanitary condition, in a state of perfection as to maturity or ripeness and undeteriorated.

Long distances covering hundreds, even thousands, of miles are embraced in the movement from the producer to the consumer. Protection against weather or climatic conditions covering wide ranges of temperature must be overcome.

Such transportation requires suitable vehicles to carry the commodities loaded therein with safety. They must be assembled within the district of production and put in sanitary and proper physical condition for use and in sufficient quantity to meet all demands promptly. The requirements must be estimated and anticipated in advance of the orders of shippers for cars, so that they may be available when wanted. This requirement is particularly true with respect to large blocks of perishable freight to be moved over long distances and to widely separated markets.

Along with the car supply must be provided an adequate quantity of ice to meet requirements at stations where needed. A large percentage of the shipments require pre-iced cars to insure the safe transportation of the commodity. Such cars are given their initial icing at the icing station most convenient to the shipping station. They are then distributed and placed at loading stations and when loaded are re-iced to the capacity of the bunkers at the first icing station in transit (usually at the point where car was first iced) after which, the re-icing is accomplished at suitable intervals at regular icing stations enroute. Regular icing stations are maintained at intervals of 24 to 30 hours apart.

Icing

It is the intent of carriers to keep the bunkers as well filled as possible. It is the general rule to not permit the ice in bunkers to sink below one-half full while cars are in transit or at destination awaiting unloading. A good rule is that the ice should not go below the level of the top of the load in the car.

The ice supply is as imperative and the requirements as pressing as is the supply of cars to cover the demands in the prompt movement of the crop. In addition to providing ice supply at regular icing stations, the carriers must be prepared to meet such difficulties in transportation as wash-outs, derailments, blockades, etc., which result in delays with consequent hazards to the safe transportation of perishable commodities. To meet this condition, a code of rules is in force, covering all such contingencies as fully as possible, in such a manner that the proper protective service is performed and without reference to anyone for additional instructions or authority. The rules are in effect, automatically and continuously, the necessary supervisory force is constantly on duty, and the labor and materials are at hand to meet the demands of the service required. Cars at destination are properly iced and cared for until unloaded.

All of the refrigeration or other protective service is performed as is provided for in the tariffs of the carriers. While until recent years such protective service regulations were published generally in separate tariffs of individual lines, these regulations, rules, and charges are now carried in a single issue and are concurred in by all carriers. This procedure has been of material assistance to carriers and shippers alike, as it simplifies the application by having all such regulations easily accessible and available to all interests involved. Though icing arrangements are in effect, the initial carrier originating the instructions of protection to be given from origin of destination. The charges for such protective service are collected with other transportation charges, upon delivery at destination. The shipper knows, when his goods are offered for transportation, the quality of the protective service he may depend upon and what the charges for such service may be to any market he may select.

Daily Reports

A system of daily reports is rendered from all regular icing stations, showing the date and hour of arrival and departure of cars, the quantity of ice in bunkers on arrival and departure, and the outside temperature. The rules governing the handling of perishable commodities in transit, are made as arbitrary as possible, so that it may not be necessary to leave anything to the judgment of employees who may, or may not, be experienced in the requirements.

It is the usual practice to give advance information by wire to icing and inspection stations, of the prospective time of arrival of trains containing perishable freight, designating the number of cars in the train to be re-iced, in order that the necessary ice supply may be on the platform and the labor available when trains arrive. Daily experience with the amounts of ice per car required to fill bunkers is the basis for the quantity of ice placed upon the platform for immediate use and the time required to put it there just prior to the need. This method of handling expedites the movement of perishable freight and the cost through shrinkage is exceedingly small, in fact almost nil, with the exception of the cases where trains may be seriously delayed immediately prior to the hour set for arrival.

All the principal routes in the United States and Canada are equipped with facilities for supplying ice and the re-icing of cars. During the past few years, due to the rapid increase

in the movement of fruits and vegetables, it has been necessary to do considerable shipping of ice to points where the daily manufacture and storage have been inadequate to protect the business offered, securing the supply from other stations where a surplus temporarily existed. Much "juggling" has been required to avoid a shortage of supply at any point. This, of course, is far from economical and carriers, generally, are increasing and improving their facilities, thus eliminating, as rapidly as possible, this costly operation which involves not only transportation, shrinkage, and extra labor of handling the ice, but the use of refrigerator equipment in demand for use in the transportation of the perishable commodity itself.

The standard rules of universal application, provide that in cases of detention to cars at points other than regular or auxiliary icing stations, refrigeration protection must be given by obtaining ice from any available source, the idea conveyed being that the property must be protected.

The operation of standard rules of protective service is now so general, that it is a remote possibility that a car of perishable freight may be handled from origin to destination without complete refrigeration protection. Some conception of the wide scope and the completeness of the organization required, may be had when the fact is realized that much of the business moves over long distances covering two or more roads, the distances ranging from 100 miles or less, to the length and breadth of the United States and Canada. The range of commodity is as varied as the distances covered.

The wide distribution of perishable food commodities throughout the whole country has developed rapidly and to some extent at least, in advance of the actual demand, much of the product seeking the market rather than the market seeking the supply. The carriers, in general, have taken an active part, individually and collectively, in projecting the trade to the utmost extent possible.

The details of the service have been brought to a high state of perfection. Uniformity of practice has had a great deal of attention in the preparation of tariffs and rules governing it. What has been accomplished in the perfection of the service has been largely the result of individual efforts by the carriers, producers and shippers representing the districts of production.

The organization of this highly specialized service for perishable freight products is a trade within itself, separate and distinct from other branches of transportation. The movement of commodities must be accomplished without detention between point of origin and point of consumption. Excepting delays brought about by unavoidable circumstances such as derailments, floods, etc., cars move with regularity so that the shipper may calculate with reasonable certainty when they will reach the destinations for which they are intended. Taking into account the inherent nature of the commodity, a close calculation can be made as to what its condition will be on reaching the market.

Loss and damage on account of improper or insufficient refrigeration in transit to products properly handled before and during transit, has been practically eliminated. The failures are man failures and relatively few considering the enormous tonnage handled.

The movement of fresh meats, packing house products, and dairy products, during the past decade, has been more or less uniform except during the war period when these commodities moved to the Atlantic seaboard for export to the various allied countries and to various cantonments. This is not true, however, of the fruit and vegetable tonnage. It has increased by leaps and bounds. Nevertheless the carriers, generally (notwithstanding the many difficulties and obstructions to the transportation machine), have moved the business in a satisfactory manner.

The total carload movement of fruits and vegetables handled by the railroads in the United States in 1917 was 516,881; in 1920, 643,068, and in 1922, 798,997. It is believed that statistics for 1923 will show a total carload movement of these commodities close to the million mark. Citrus fruits from California began to move in refrigerator cars about 1888. In 1900 the crop amounted to 24,900 carloads; in 1910, 33,099; 1920, 44,576, and in the present year it will total, approximately, 60,000 carloads. California grapes in 1917 amounted to 13,943; in 1922, 43,663, and in 1923 should exceed 50,000 carloads. Other commodities have shown like increases.

The Operation of Car Icing Stations

By J. W. Inghram
Chief Engineer, Railway Ice Company, Chicago

The present method of handling and icing refrigerator cars containing perishable food products represents a state of perfection which has been brought about by reason of the gradual development and improvement in various refrigeration processes and mechanical devices. In earlier days before the present perfected and highly efficient system of using manufactured ice for the refrigeration of railway cars was in vogue, natural ice was used exclusively in railway refrigeration work. The natural ice was stored in unrefrigerated houses which were necessarily located close to the source of natural ice supply for convenience in filling and usually remote from the points where the ice was to be used during the icing season. This is expensive, unreliable and inefficient, as it requires double handling, entails a heavy shrinkage during shipment and necessitates the transportation of the ice and the employment of railway cars which are always in demand for other service. There is the additional objection that sawdust or straw is necessarily used for packing and insulating purposes, with the result that some of this insulating substance becomes attached to or frozen in the ice, and often causes the drain pipes in the refrigerator cars to be clogged with a resultant flooding of car floors and consequent damage to the car contents.

In order to understand the mechanics of a modern car icing plant, it may be in order to refer briefly to the developments which have taken place in refrigeration apparatus and practices. In the years of 1873-75 the first successful ammonia compression machines were introduced by C. P. G. Linde of Germany and David Boyle of the United States. From 1875 to 1890 many new forms of apparatus were produced and certain improvements were made, but until 1890 the practical utilization and commercial application of refrigeration were quite limited and the development of the science of refrigeration had seemed to come to a standstill. But in 1890 an unusual shortage in the crop of natural ice in the United States awakened the general public to the possibilities of the use of mechanical refrigeration. In more recent years in many instances electricity has been substituted for steam as a source of power in ice manufacture, and because distilled water as a by-product of steam is not available for freezing into ice at such electric plants, there has been developed the present effective and efficient process of manufacturing crystal, merchantable ice from raw water through a process of agitation, by the injection of air into the water being frozen into ice.

Briefly, during the last 30 years the methods of producing refrigeration have been so improved and developed that at present mechanical refrigeration is practically applied to many processes and uses in the industrial world, and certainly one of the most vital and important of these uses of modern refrigeration is its application to the protection and preservation of perishable food products in transit.

The site usually selected for an icing station is one adapted to the rapid handling and switching of cars to and from the

icing plant and its platforms, consideration being given also to the fact that the site should contain ample space for such future extensions of the plant or its platforms as may be necessary to take care of increasing business.

In former years the moving of ice out of a storehouse to the icing platform and into car bunkers was done by hand, which was both expensive and comparatively slow, but today efficient machinery for handling and conveying ice has been developed to a high state of perfection. Conveyor chains deliver the ice from the storage house to a tower located immediately above the car icing dock at which point the ice is received by a similar conveyor chain or other lowering device which in turn lowers the ice from the 22-ft. elevation to the top of the car icing dock which is only a foot or two higher than the top of a refrigerator car. To transport a cake of ice over this route, as outlined, it may be necessary to employ three separate conveyor chains, but all of such chains are synchronized so that the ice is kept under constant control without manual effort until it is placed on the dock ready for injection into the bunkers of refrigerator cars.

Car icing platforms or docks are usually constructed of heavy timbers and are elevated approximately 14½ ft. above the adjacent tracks and are from 15 to 17 ft. in width and approximately 1,000 ft. in length. A conveyor chain in the center and running the full length of the platform distributes ice to points along the platform and since the chain can be reversed in direction, ice located at one point on the platform can be moved to any other point desired. After the cakes of ice are removed from the conveyor chain at the desired points on the platform, such cakes are then broken up into smaller pieces by the use of hand tools. The placing of the pieces of ice, after the cake has been broken, into the bunkers of the cars is done by hand, the cake being skidded into its desired destination without much effort through the use of a tool called an ice hook.

The process so far described pertains to the refrigeration of cars which contain fruit and vegetables and, therefore, do not require temperatures which approximate the freezing point. The initial icing and re-icing of cars which contain packing house products and necessitate a lower temperature require a different process as crushed ice mixed with salt must be used for this purpose, the quantity of salt usually ranging from 10 to 15 per cent, by weight of the crushed ice. In this process of meat car icing, machinery has largely superseded manual labor. The cakes of ice are carried by a conveyor chain to a crusher which consists of a power driven revolving cylinder, into which are fitted pointed steel spikes which crush and cut the ice into small and uniform pieces. These crushers are made in various sizes and may be designed to handle as much as 50 tons per hour. Platforms for meat car icing using crushed ice and salt are usually constructed about six or seven feet above the cake icing platform, creating what is termed a double-deck dock, the second platform, or crusher ice deck, being located approximately 22 ft. above the rail. Movable chutes are attached to the edge of the second or crushed icing deck, which chutes are moved into place so that their lower ends point directly into the bunkers of the meat cars which are to be iced. The crushed ice is then dumped from a cart into the receiving end of the chute, from which it travels directly and rapidly to the car bunkers, after which salt in proper proportion and amount is thrown into the bunker by hand. Salt bins holding 1,000 lb. of salt each are placed at such points along the dock, so that salt is within easy reach of any and all cars set for icing.

The main purpose of the facilities and mechanical devices which have been referred to herein is to provide means by which the car icing plant may take care of the requirements rapidly, efficiently and certainly. With an icing dock such as the one described herein, which is approximately 1,000 ft. long and served by tracks on both sides, it is possible to spot a train of approximately 44 cars along two sides of the dock for immediate icing of all the cars. It is possible to ice the railway cars, after being switched alongside the docks, at the rate of approximately one to two minutes to each car or an entire 44 cars in about one hour.

Is Railway Consolidation a Remedy?*

By W. E. Farris
Vice-President and General Manager, New Orleans Great Northern

THE TRANSPORTATION ACT provides that the Interstate Commerce Commission—"shall as soon as practicable prepare and adopt a plan for the consolidation of the railway properties of the continental United States into a limited number of systems." Pursuant to this law, the commission has prepared a tentative plan of consolidation, under which—if the plan is finally adopted by the commission and approved by congress—the railroads shall have the right to consolidate into 19 systems, in accordance with the approved plan. If the railroads then do not voluntarily follow this plan and consolidate, the next step in the proposed scheme is that congress shall pass a law compelling them to consolidate.

Do the people really want the railroads consolidated into a few systems? My own opinion is the people have not given this question any serious consideration. There has been very little general discussion of this matter except by the proponents of the plan. I believe that if this proposed plan of consolidation is carried out, that a long stride towards government ownership will have been taken. After the railroads are consolidated, there can be no return to the old order of things, and for this reason—if for no other—we ought to hesitate a long time before we try this experiment.

Senator Cummins, one of the co-authors of the Transportation Act, and a strong advocate of consolidation, seems to be skeptical about the ultimate success of his plan. He is reported to have said that if consolidation is not a success, the next step will be government ownership.

These 19 systems will have an average mileage of about 14,000 miles. The president of a railroad corporation is its responsible head. No one who gives the subject any serious thought will deny that it is physically impossible for the president of such a large mileage to give his personal attention to its operation. The result would be absentee management on a very large part of our railroad mileage. Each railroad system ought to be small enough so that its president could frequently visit with its patrons and learn first-hand of their needs. This would give them an opportunity to get better acquainted and to understand and appreciate each other's problems. My own view is that some of our present systems are too large for efficient and economical operation, and that it would be better if it were possible to do so to take some of the mileage away rather than to add more to them.

The Analogy of Federal Control

The advocates of consolidation hold out the bait to the people that after the railroads have been put into a few systems they will be able to give better service at lower cost, thus enabling them to reduce freight rates and passenger fares. They seem to think that consolidation will bring about greater common use of facilities and that a great saving will, in this way, be effected. This was tried out during federal control with doubtful results. They say that a great many railroad officers will be dispensed with, making a large

*Address delivered before convention of Southern Cotton Traffic Association at New Orleans, La., September 6, 1923.

saving in payroll expense. Perhaps a small saving could be effected in this way, but this saving would be more than offset by the loss that would follow less supervision. We had a very striking example of this theory during federal control. The railroads were consolidated into one system for operating purposes. The service of the presidents was dispensed with. A blanket increase of 25 per cent was made in freight rates. Passenger fares and other charges were increased. Cost of operation increased out of proportion to the increase made in freight rates and passenger fares, with the result that for the 26 months of federal control the railroads lost $1,265,000,000, which the people are paying through increased taxation. I am of the firm conviction that this enormous loss was due almost entirely to lack of supervision of operation. Looking back, and without any thought of criticizing the government for the action it took, I believe that if the railroads had been left in the hands of their presidents, they would have functioned just as well as they did, if not better, at a great saving in expense to the government.

The law imposes an obligation on the Interstate Commerce Commission in preparing its plan of consolidation to preserve competition. Theoretically this can be done, but actually it cannot. Let us take for example the case of a comparatively small road with several trunk line connections. Each of these trunk lines is now competing for the business of this small road. The result is the shippers on this small road receive first-class service in the matter of both car supply and prompt handling. Under the proposed plan of consolidation, this small road is allocated to one of the big systems. Thereafter the shippers are compelled to route their freight via the system lines so that the system company will enjoy all of the earnings. The small road's other trunk line connections will not be permitted to compete for this traffic, and thus competition is destroyed. There are hundreds of small roads, or short lines, on which thousands of shippers are located where competition will be destroyed if this proposed plan of consolidation is forced upon the railroads.

The thing that makes the individual efficient is competition. The thing that makes a manufacturing plant efficient is competition, and the thing that makes a railroad efficient is also competition. There was no competition during federal control of railroads, and we, who were sitting on the side lines, observed with sorrowful hearts the woeful lack of efficiency. It is true that a large volume of traffic was handled, but it was done at a frightful cost. Destroy competition and you take away the incentive to be efficient. Summed up in a few words, loss of efficiency on our railroads means poor service at high rates.

If this proposed plan of consolidation is consummated, there will be millions of dollars of property made valueless. Railroad shops located on the small roads will be abandoned. Towns have been built up around these shops. The population of these towns are supported very largely by the employees that work in these shops. The homes in these towns —owned by mechanics, clerks, professional men and others of small means, some not paid for—will be made practically valueless. Merchants who have located in these small towns will suffer great loss. Think of the heart aches, privation and misery that will follow in the wake of the consummation of this plan with no resultant benefit to anyone.

The several hundred small railroads, each with a separate management, co-operating with the people along its line in an endeavor to develop the territory that it serves, both agriculturally and industrially, will become branches of these large and unwieldy systems. The natural result of this will be that the management of these large systems will concentrate their efforts in developing the territory along the main trunk lines to the neglect and detriment of the territory served by the branch lines.

Consolidation means a greater centralization of population, causing a greater movement of the people away from the farms and small towns to the large centers where the congestion is already too great for the comfort, happiness and general welfare of the people. I think we all will agree that what the country needs above everything else is less centralization—a movement away from the large centers, back to the country and small towns.

Consolidation will cause greater centralization of wealth and power. These 19 systems will comprise a total of about 263,000 miles of railroad. Think of the potential power that will be lodged in the hands of the 19 railroad presidents, with jurisdiction over this vast mileage and the almost limitless territory that it serves. My advice to the people is to "stop, look and liston" before they approve a scheme so revolutionary as this one is.

The scheme of grouping our railroads contemplates putting strong roads and weak roads together. The security holders will be required to give up their securities in exchange for securities of the consolidated system. In other words, the holders of the securities of the strong roads will be required to give up securities that have a definite value for securities of uncertain value for the benefit of the holders of securities of the weak roads. I submit that this is a form of socialism that the people will never subscribe to if they fully understand the proposition.

There is another very strong reason why we ought not to try the experiment of grouping our railroads into a few systems. The railroads now pay more than $300,000,000, taxes annually. The most of this enormous sum is paid to the states. If this experiment fails, government ownership is inevitable and then the states will be deprived of this source of revenue, for the states cannot tax the property of the United States. The people are certainly in no position to have their taxes increased.

If this proposed scheme of consolidation is defeated, it will have to be done by the producers and shippers working through organizations such as yours. There is no time to waste. We are informed that the Interstate Commerce Commission is now preparing its report for submission to the next Congress, and unless there is a strong protest from the people, the Commission's plan will be approved and Congress will, in all probability, then attempt to pass a law compelling the railroads to consolidate in accordance with the approved plan as there is no probability that the railroads will voluntarily attempt to consolidate into a limited number of systems.

I am sure that none of us want to see a movement started that will finally end in government ownership and operation of railroads.

International

Great Northern Shopman "Signing Up" for Purchase of Stock in His Company

General News Department

The American Society for Testing Materials will hold its next annual meeting at the Chalfonte-Haddon Hall, Atlantic City, N. J., on January 23-27, inclusive.

The Dixie Limited of the Nashville, Chattanooga & St. Louis, southbound, was derailed at Kennesaw, Ga., on December 22, and the locomotive was overturned. The engineman was killed and two other trainmen were injured. Injuries to passengers were all reported as not serious.

The Supreme Court of Illinois adjourned on December 19 without handing down a decision regarding the sale of the Chicago, Peoria & St. Louis. The Circuit Court of Sangamon county ordered the road sold for the bondholders in January, but Attorney-General Brundage filed a petition for a writ of error to the Supreme Court to have the state made a party to the suit. Attorneys for the road opposed the petition for the writ in the higher court and arguments were heard several days ago. It is expected that the adjournment of the court will cause the sale to be postponed again.

New England Veterans Plan Club House

The New England Association of Railroad Veterans, the members of which are employees of various railroads, who have been in the service 20 years or more, held its annual election on December 12 and the president for the ensuing year is Wilson E. Rogers. There is a proposition to build a club house, and for this purpose members have formed the New England Railroad Veterans' Building Association of Massachusetts. The meeting was held at 49 Friend street, Boston.

Inspection Bureau Finds Defective 43 Per Cent of Locomotives Inspected

The Interstate Commerce Commission's monthly report to the President on the condition of railroad equipment shows that during November 5,653 locomotives were inspected by the Bureau of Locomotive Inspection, of which 43 per cent were found defective, and 466 were ordered out of service. Also, 101,539 freight cars were inspected by the Bureau of Safety, of which 4.9 per cent were found defective and 1,855 passenger cars, of which 1.5 per cent were found defective.

Clerks' Union Loses Case Against P. R. R.

In the United States Court at Philadelphia on December 21, the suit of the Brotherhood of Clerks, Freight Handlers and Station Employees against the Pennsylvania Railroad to compel recognition of this brotherhood in negotiations about wages, was dismissed, the judge holding that the federal court had no authority to enforce orders of the United States Railroad Labor Board. It was declared that the only way the board's mandates could be carried out would be in the court of public opinion. The brotherhood at once appealed the case to the United States Circuit Court of Appeals.

Burlington Opens New Denver Shops

The opening of the new shops of the Chicago, Burlington & Quincy at North Denver, Colo., was marked by a formal dedication on December 5 which was attended by a large number of Burlington officers, representatives of other roads and business men and local officials of the city. Invitations to the dedication were extended to 560 Denver business men and large numbers responded. Following a luncheon in the new building, Governor Sweet of Colorado, Mayor Stapleton of Denver, vice-president Baldwin of the Burlington, former governer E. M. Hammons and Thomas B. Stearns, representing the contractors who constructed the shops, gave short talks. A trip of inspection through the shops followed. The speakers at the dedication termed the shops the "biggest single improvement brought to Denver in its history." The plant will be used primarily for the repair and rebuilding of locomotives used on the Colorado & Southern and on the Burlington lines in Colorado, Wyoming and western Nebraska.

Program for Arguments on Consolidation

The Interstate Commerce Commission announces that the oral argument on its railroad consolidation plan commencing on January 7, 1924, parties who have indicated a desire to be heard will appear in the following order:

MONDAY—JANUARY 7

10.30 a. m.—New York Central.
11.30 a. m.—Pennsylvania.
12 m.—Baltimore & Ohio.
2.30 p. m.—Reading.
5.30 p. m.—Port Authority of New York.

TUESDAY—JANUARY 8

10.30 a. m.—Merchants Association of New York.
10.45 a. m.—Pennsylvania Chamber of Commerce.
11.00 a. m.—Philadelphia Trade Bodies.
11.15 a. m.—Anthracite Coal Operators' Association.
11.30 a. m.—Delaware & Hudson.
12 m.—Nickel Plate.
2.00 p. m.—Buffalo, Rochester & Pittsburgh.
2.15 p. m.—Boyne City, Gaylord & Alpena.
2.30 p. m.—New Haven.
3.30 p. m.—Boston & Maine.
4.10 p. m.—Maine Central.

WEDNESDAY—JANUARY 9

10.30 a. m.—City of Boston.
10.40 a. m.—Storrow Committee.
11.40 a. m.—State Chamber of Commerce of Maine.
12 m.—Chesapeake & Ohio.
2.00 p. m.—Norfolk & Western.
2.30 p. m.—Atlantic Coast Line and Louisville & Nashville.
3.30 p. m.—Illinois Central.

THURSDAY—JANUARY 10

10.30 a. m.—City of Mobile, Ala.
10.45 a. m.—Union Pacific.
11.45 a. m.—Burlington, Northern Pacific and Great Northern.

FRIDAY—JANUARY 11

10.30 a. m.—Burlington and others.
12.00 m.—Duluth, Missabe & Northern and others.
2.00 p. m.—Southern Pacific.
3.00 p. m.—Cotton Belt.
3.30 p. m.—Public Utilities Commission of Kansas and others..

SATURDAY—JANUARY 12

10.30 a. m.—Railroad Commission of Texas and others.
11.30 a. m.—City of Denver and others.
2.00 p. m.—Pueblo Commerce Club.
3.00 p. m.—Moffat Tunnel Commission.
3.15 p. m.—Soo Line.

Those who desire to file briefs are reminded that briefs should be filed on or before January 7, 1924. A copy of each brief should be served on those who have heretofore entered appearances indicating interest in the subject matter of the brief.

Real Life in Birmingham

Freight trains that are dreamy and that "float" across the streets are among the things seen by the Birmingham (Ala.) Age-Herald when it goes out for news with local color. On a recent afternoon the reporter found this:

"Three long trains drifting good-naturedly across Twentieth street played tag with time so successfully that 84 automobiles, 16 street cars, 17 other vehicles and eight bicycles were tied up in less than 15 minutes without any of the trains incurring a great deal of blame.

"The first train came on the stage at 2:26 o'clock and left at 2:31; the second at 2:32 and left at 2:36; the third at 2:38 and left at 2:40. They seemed to profit by experience.

"Six trolleys stopped to let the first train pass; three from the north side, and three from the south side. Fifty-three automobiles, five other vehicles and six bicycles kept company with more than two-score pedestrians for the first act.

"Seven street cars, a dozen automobiles, three other vehicles, two bicycles and 27 pedestrians were compelled to watch the second train drift by.

"Three street cars, 19 automobiles, nine other vehicles and 13 pedestrians were held up by the passage of another train.

"A railroad matador with a green flag tucked neatly under his left arm and whirling a red ensign with the other in an energetic way tried to flag down the whole show. The boys on bicycles ignored him, as did the great majority of pedestrians. Philosophically and mathematically speaking, they seemed to agree that it was a darn sight easier to dodge and risk than it was to go around to Birmingham's one respectable north and south viaduct."

Tie Producers' Association Convention

The sixth annual convention of the National Association of Railroad Tie Producers will be held at the Hotel Muehlebach, Kansas City, Mo., on January 17-18, immediately following the convention of the American Wood-Preservers' Association. The convention will be called to order at 2 o'clock on the afternoon of January 17. The program follows:

THURSDAY AFTERNOON

Opening exercises.

Reports of officers and standing committees.

Reports of district vice-presidents on conditions in the tire industry in their areas.

THURSDAY EVENING

Annual dinner with the American Wood-Preservers' Association.

FRIDAY, JANUARY 18

Paper on Southern Pine Ties, by C. D. Christian.

Paper on Why There Is a Need for a Tie Association, by J. H. Johnson, Richmond, Ind.

Paper on Developments in the Tie Industry During the Last 20 Years, by Dr. Hermann Von Schrenk, consulting timber engineer, St. Louis, Mo.

Paper on Cross Tie Conditions on the Pacific Coast, by Mason E. Kline, superintendent, St. Helen's Creosoting Company, St. Helen's, Ore.

LUNCHEON

Address on The Railroad Problem and the Tie Industry, by L. W. Baldwin, president, Missouri Pacific, St. Louis, Mo.

FRIDAY AFTERNOON

Paper on How Motor Trucks Handle Cross Ties, by Saunders Jones, vice-president, White Motor Company, St. Louis, Mo.

Paper on How the Railroads and Tie Producers Can Co-operate to Secure a More Practical Separation of the Ties in Field, by D. E. Erhart, lumber agent, Central region, Pennsylvania Railroad, and Walter Poleman, president, Western Tie & Timber Company, St. Louis, Mo.

National Transportation Institute Begins Lecture Courses

The lecture course on transportation, planned by the National Transportation Institute, has been inaugurated by the delivering of the first lecture at Fairmont College, Wichita, Kans., by Carleton B. Hutchings, secretary of the institute. Two other lectures at the same college were given by Professor Arthur H. Blanchard, professor of highway engineering and highway transport of the University of Michigan, and by Professor Charles L. Raper, dean of the College of Business Administration of Syracuse University. Schedules of the lectures have already been approved for 16 colleges and universities in the middle west and others are being made from time to time.

Eleven university professors of transportation and economics have joined with the institute in giving the courses. Those already engaged for the work in addition to Professors Blanchard and Raper are Frank H. Dixon, professor of economics and social institutions, Princeton University; G. W. Dyer, professor of sociology, Vanderbilt University, Nashville, Tenn.; Dr. David Friday, director of research, National Transportation Institute and former president, Michigan Agricultural College; Emory R. Johnson, professor of transportation, University of Pennsylvania; H. G. Moulton, director, Institute of Economics, Washington, D. C.; C. O. Ruggles, professor of transportation and public utilities, Ohio State University; T. W. Van Metre, professor of transportation, Columbia University; Harold Whitehead, Boston University, and C. B. Hutchings, secretary, National Transportation Institute and director of transportation department, American Farm Bureau Federation.

Colleges that have already arranged for lecture courses include Fairmount College, Wichita, Kans.; Ottawa University, Ottawa, Kans.; Kansas Agricultural College, Manhattan, Kans.; Bethany College, Lindsborg, Kans.; Cornell College, Mt. Vernon, Ia.; Coe College, Cedar Rapids, Ia.; Simpson College, Indianola, Ia.; Grinnell College, Grinnell, Ia.; Penn College, Oskaloosa, Ia.; University of Detroit, Detroit, Mich.; Albion College, Albion, Mich.; Hillsdale College, Hillsdale, Mich.; Kalamazoo College, Kalamazoo, Mich.; Adrian College, Adrian, Mich., and Alma College, Alma, Mich.

A Boon to Boonton Commuters

If by mistake you leave your monthly ticket at home and pay regular single-ticket fare, the money paid will be refunded. This friendly message has come to the ears of "commuters" recently, on two New York railroads; a recognition of the fact that, to a good many people, the expenditure of a half-dollar for a ride, under the circumstances indicated, is a source of more poignant regret than would be felt at many a loss very much larger than that. The passenger, however, does not get his money merely by holding out his hand; he is invited to present his claim in writing, according to the following form:

THE DELAWARE, LACKAWANNA AND WESTERN RAILROAD COMPANY

Application for refund of cash fares paid on account of failure of passenger to have sixty-trip monthly ticket at time of trip.

_____ Date

State of _____ } ss
County of _____ }

I, _____ residing at _____ in the State of _____ being duly sworn do depose and say: that I am the owner of a sixty-trip monthly commutation ticket No. _____ issued by The Delaware, Lackawanna and Western Railroad Company for the month of _____, 192____, I did not have said ticket in my possession at the time I made the trip for the following reason:

_____

_____

_____

and was compelled to pay fare on the train from _____ to _____ as per cash fare receipts submitted herewith, (or purchase tickets at Ticket Offices as follows:)

_____

_____

receipts for which are attached.

Or

I used fifty-trip family ticket No. _____ or ten-trip ticket No. _____ for _____ rides between _____ and _____ and same is submitted herewith.

I further depose and say: that the sixty-trip monthly commutation ticket described herein was not used by any person on the date on which fares were paid by me for which this is a refund application.

_____

Subscribed and sworn to before me this _____ day of _____ 192____

_____

1900 Form P.T.D. 6 9/23

Call for National Transportation Conference

A call for a national conference on transportation, to be held in Washington, January 9, 10 and 11, has been issued by Julius H. Barnes, president of the Chamber of Commerce of the United States. Two hundred leaders of recognized standing in agricultural, commercial, educational, financial and industrial fields have been invited to take part. It is expected that every state will be represented by spokesmen for national farm and labor organizations, public officials, editors and publishers, heads of corporations, bankers, railway executives and others.

"Congress embarked upon a constructive policy by the enactment of the Transportation Act of 1920," says the call, "but there is much more to be done. * * * All production is dependent on adequate and ready distribution.

"National income, earned only through transportation and distribution, rises thus:

1890	$12,000,000,000
1900	18,000,000,000
1910	32,000,000,000
1920	60,000,000,000
1930	What?
1940	What?"

The following questions will be discussed:

What is the probable future of transportation growth?

What principles of regulation, federal and state, protect the public interest and yet encourage expansion?

What policies promise to attract the necessary capital and credit?

What principles of rate-making hold most fairly the scale of relative rates?

Where does highway and motor transport promise its highest service?

How can water highways contribute their fullest service?

Within what formula can all transportation develop best the stimulant of private initiative and enterprise in the very interest of expanding service and the utmost economy of operation?

Reports of committees appointed last January have been already made public. They deal with: (1) Government Relations to

Railroad Transportation; (2) Railroad Consolidation; (3) Readjustment of Relative Freight Rates; (4) Relation of Highway and Motor Transport to Other Transportation Agencies; (5) Development of Waterways and Co-ordination of Rail and Waterway Service; (6) Taxation of Transportation Agencies.

American Wood-Preservers' Association Convention

The American Wood-Preservers' Association will hold its twentieth annual convention at the Muehlebach Hotel, Kansas City, Mo., on January 15-17. The program for this convention is as follows:

TUESDAY, JANUARY 15

Convention called to order.
Opening exercises.
Report of secretary-treasurer.
Address of president.
Report of Committee on Retailing Forest Products, by George E. Rex, vice-president, National Lumber & Creosoting Company, Kansas City, Mo.
Paper on Visual Determination of Penetration of Sodium Fluoride in Treated Wood, by George T. Parker and H. A. Geauque of Lombard College, Galesburg, Ill.

TUESDAY AFTERNOON

Report of Committee on Preservatives, Ernest Bateman, chemist in forest products, Forest Products Laboratory, Madison, Wis., chairman.
Paper on Saving Timber by Saving Coal, by Dr. R. P. Soule, chemical engineer, Combustion Utilities Corporation, New York City.
Paper on a Theory on the Mechanism of the Protection of Wood by Preservatives: Part V, Further Work with Hydrocarbons, by Ernest Bateman and E. Henningson.
Paper on Comparative Resistance of Seventeen Species of Wood-Destroying Fungi to Sodium Fluoride, by Audrey C. Richards.
Report of Committee on Treatment of Car Lumber, F. S. Shinn, supervisor, treating plant, Chicago, Burlington & Quincy, Galesburg, Ill., chairman.
Report of Committee on Treatment of Timber, H. R. Condon, assistant forester, Pennsylvania, Philadelphia, Pa., chairman.
Report of Committee on Treatment of Piling, W. J. Kelleher, general manager, Southern Creosoting Company, Slidell, La., chairman.
Report of Committee on Pressure Treatment of Poles, C. C. Fritz, manager, pole department, Long-Bell Lumber Company, Kansas City, Mo., chairman.
Report of Committee on Non-Pressure Treatment of Poles, L. L. Hill, secretary, Page & Hill Company, Minneapolis, Minn., chairman.

WEDNESDAY, JANUARY 16

Report of Committee on Treatment of Ties, J. R. Helson, superintendent, Watkins Creosoting Company, Metropolis, Ill., chairman.
Report of Committee on Treatment of Douglas Fir Ties, H. E. Horrocks, manager, Pacific Creosoting Company, Seattle, Wash., chairman.
Report of Committee on Use of Petroleum with Creosote Oil or Other Toxics, R. S. Belcher, manager, treating plants, Atchison, Topeka & Santa Fe, Topeka, Kan., chairman.
Paper on Solutions of Zinc Chloride and Petroleum Oils by Ernest Bateman.
Report of Committee on History and Use of Zinc Chloride as a Wood Preservative, by Dr. Hermann von Schrenk, consulting timber engineer, St. Louis, Mo.

WEDNESDAY AFTERNOON

Report of Committee on Pressure Treatment of Posts, W. J. Smith, tie and timber agent, Missouri-Kansas-Texas, Denison, Tex., chairman.
Report of Committee on Utilization and Service of Treated Posts, by W. J. Smith.
Report of Service Bureau Board, Carl G. Crawford, vice-president, American Creosoting Company, Inc., Louisville, Ky., chairman.
Report of Committee on Track Service Records, Z. M. Briggs, assistant engineer, maintenance, Pennsylvania, Pittsburgh, Pa., chairman.
Paper on Relation of Temperature and Pressure to the Absorption and Penetration of Zinc Chloride Solution into Wood, J. D. MacLean, engineer in forest products, Forest Products Laboratory, Madison, Wis., chairman.

THURSDAY, JANUARY 17

Report of Committee on Inspection, F. N. Graham, chief timber inspector, Chicago Great Western, Chicago, chairman.
Report of Committee on Steam Treatments, George M. Hunt, in charge section of wood preservation, Forest Products Laboratory, Madison, Wis., chairman.
Election of officers.

Meetings and Conventions

The following list gives names of secretaries, dates of next or regular meetings and places of meetings:

AIR BRAKE ASSOCIATION.—F. M. Nellis, 165 Broadway, New York City. Exhibit by Air Brake Appliance Association.

AIR BRAKE APPLIANCE ASSOCIATION.—Joseph Sinkler, Pilot Packing Company, 122 South Michigan Ave., Chicago. Meeting with Air Brake Association.

AMERICAN ASSOCIATION OF DINING CAR SUPERINTENDENTS.—L. A. Stone, C. & E. I. Ry., Chicago.

AMERICAN ASSOCIATION OF ENGINEERS.—C. E. Drayer, 63 E. Adams, St., Chicago.

AMERICAN ASSOCIATION OF FREIGHT TRAFFIC OFFICERS.—Grant Williams, 1341 Railway Exchange, Chicago.

AMERICAN ASSOCIATION OF GENERAL BAGGAGE AGENTS.—E. L. Duncan, 332 So. Michigan Ave., Chicago. Next meeting, June 3, 1924, Montreal, Canada.

AMERICAN ASSOCIATION OF PASSENGER TRAFFIC OFFICERS.—W. C. Hope, C. R. R. of N. J., 143 Liberty St., New York.

AMERICAN ASSOCIATION OF RAILROAD SUPERINTENDENTS.—J. Rothchild, Room 400, Union Station, St. Louis, Mo. Next meeting, June 18-20, 1924, Buffalo, N. Y.

AMERICAN ELECTRIC RAILWAY ASSOCIATION.—J. W. Welsh, 8 W. 40th St., New York.

AMERICAN RAILROAD MASTER TINNERS', COPPERSMITHS' AND PIPE FITTERS' ASSOCIATION.—C. Borcherdt, 202 North Hamilton Ave., Chicago, Ill.

AMERICAN RAILWAY ASSOCIATION.—J. E. Fairbanks, General Secretary, 30 Vesey St., New York, N. Y.
Division I.—Operating, J. C. Caviston, 30 Vesey St., New York, N. Y.
Freight Station Section (including former activities of American Association of Freight Agents).—R. O. Wells, Freight Agent, Illinois Central Railroad, Chicago, Ill.
Medical and Surgical Section.—J. C. Caviston, 30 Vesey St., New York, N. Y.
Protective Section (including former activities of the American Railway Chief Special Agents and Chiefs of Police Association).—J. C. Caviston, 30 Vesey St., New York, N. Y.
Safety Section.—J. C. Caviston, 30 Vesey St., New York.
Telegraph and Telephone Section (including former activities of the Association of Railway Telegraph Superintendents).—W. A. Fairbanks, 30 Vesey St., New York, N. Y.
Division II.—Transportation (including former activities of the Association of Transportation and Car Accounting Officers).—G. W. Covert, 431 South Dearborn St., Chicago, Ill.
Division III.—Traffic, J. Gottschalk, 143 Liberty St., New York.
Division IV.—Engineering, E. H. Fritch, 431 South Dearborn St., Chicago, Ill. Next annual meeting, March 11-13, 1924, Chicago. Exhibit by National Railway Appliances Association.
Construction and Maintenance Section.—E. H. Fritch.
Electric Section.—E. H. Fritch.
Signal Section (including former activities of the Railway Signal Association).—H. S. Balliet, 30 Vesey St., New York, N. Y. Annual meeting March 13 and 14, 1924, Drake Hotel, Chicago. Next "stated meeting," Sept. 22, 1924, Ocean View Hotel, Swampscott, Mass.
Division V.—Mechanical (including former activities of the Master Car Builders' Association and the American Railway Master Mechanics' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill. Annual convention, June 11-18, 1924, Atlantic City, N. J. Exhibit by Railway Supply Manufacturers' Association.
Equipment Painting Section (including former activities of the Master Car and Locomotive Painters' Association).—V. R. Hawthorne, 431 South Dearborn St., Chicago, Ill.
Division VI.—Purchases and Stores (including former activities of the Railway Storekeepers' Association). W. J. Farrell, 30 Vesey St., New York, N. Y.
Division VII.—Freight Claims (including former activities of the Freight Claim Association).—Lewis Pilcher, 431 South Dearborn St., Chicago, Ill. Next convention, April, 1924, New Orleans, La.
Car Service Division.—C. A. Buch, 718 18th St., N. W., Washington, D. C.

AMERICAN RAILWAY BRIDGE AND BUILDING ASSOCIATION.—C. A. Lichty, C. & N. W. Ry., 319 N. Waller Ave., Chicago. Next annual convention, Oct. 21-23, 1924, Kansas City, Mo. Exhibit by Bridge and Building Supply Men's Association.

AMERICAN RAILWAY DEVELOPMENT ASSOCIATION.—W. H. Hill, Agricultural Agent, New York Central, Chicago. Next annual meeting, May 14-16, 1924, Savannah, Ga.

AMERICAN RAILWAY ENGINEERING ASSOCIATION.—(Works in co-operation with the American Railway Association, Division IV.) E. H. Friteh, 431 South Dearborn St., Chicago. Next annual meeting, March 11-13, 1924, Chicago. Exhibit by National Railway Appliances Association.

AMERICAN RAILWAY MASTER MECHANICS' ASSOCIATION.—(See American Railway Association, Division V.)

AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—J. A. Duca, Tool Foreman, C. R. I. & P. Ry., Shawnee, Okla. Exhibit by Supply Association of the American Railway Tool Foremen's Association.

AMERICAN SHORT LINE RAILROAD ASSOCIATION.—T. F. Whittelsey, Union Trust Building, Washington, D. C.

AMERICAN SOCIETY FOR STEEL TREATING.—W. H. Eisenman, 4600 Prospect Ave., Cleveland, Ohio.

AMERICAN SOCIETY FOR TESTING MATERIALS.—C. L. Warwick, 1315 Spruce St., Philadelphia, Pa.

AMERICAN SOCIETY OF CIVIL ENGINEERS.—Prof. J. H. Dunlap, 33 W. 39th St., New York. Annual meeting, Jan. 16-18, 33 W. 39th St., New Yerk. Regular meetings 1st and 3rd Wednesdays in month, except July and August, 33 W. 39th St., New York.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS.—Calvin W. Rice, 29 W. 39th St., New York. Railroad Division, A. F. Stuebing, Bradford Draft Gear Co., 23 W. 43rd St., New York.

AMERICAN TRAIN DISPATCHERS' ASSOCIATION.—C. L. Darling, 1310-1311 Mallers Bldg., Chicago, Ill.

AMERICAN WOOD PRESERVERS' ASSOCIATION.—P. R. Hicks, Room 1146, Otis Bldg., Chicago. Next convention, January 15-17, 1924, Muehlebach Hotel, Kansas City, Mo.

ASSOCIATION OF RAILWAY CLAIM AGENTS.—H. D. Morris, Northern Pacific Ry., St. Paul, Minn. Annual meeting, May, 1924, West Baden, Ind.

ASSOCIATION OF RAILWAY ELECTRICAL ENGINEERS.—Jos. A. Andreucetti, C. & N. W., Room 411, C. & N. W. Sta., Chicago. Exhibit by Railway Electrical Supply Manufacturers' Association.

ASSOCIATION OF RAILWAY EXECUTIVES.—Stanley J. Strong, 17th and H Sts., N. W., Washington, D. C.

ASSOCIATION OF RAILWAY SUPPLY MEN.—A. W. Clokey, 1658 McCormick Bldg., Chicago. Meeting with International Railway General Foremen's Association.

ASSOCIATION OF RAILWAY TELEGRAPH SUPERINTENDENTS.—(See American Railway Association, Division I.)

ASSOCIATION OF TRANSPORTATION AND CAR ACCOUNTING OFFICERS.—(See American Railway Association, Division II.)

BRIDGE AND BUILDING SUPPLY MEN'S ASSOCIATION.—John Nelson, Joseph E. Nelson & Sons, 3240 South Michigan Ave., Chicago. Meeting with convention of American Railway Bridge and Building Association.

CANADIAN RAILWAY CLUB.—W. A. Booth, 53 Rushbrook St., Montreal, Que.

CAR FOREMEN'S ASSOCIATION OF CHICAGO.—Aaron Kline, 626 North Pine Ave., Chicago. Regular meetings, 2nd Monday in month, except June, July and August, Great Northern Hotel, Chicago.

CAR FOREMEN'S ASSOCIATION OF ST. LOUIS, MO.—Thomas B. Koeneke, 604 Federal Reserve Bank Bldg., St. Louis, Mo. Meetings, first Tuesday in month at the American Hotel Annex, St. Louis.

CENTRAL RAILWAY CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Meetings, 2d Thursday, January to November, Hotel Iroquois, Buffalo, N. Y. Interim meetings, 2d Thursday, February, April, June, Hotel Statler, Buffalo, N. Y. Colden jubilee dinner, January 10, Hotel Statler.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S ASSOCIATION.—A. S. Sternberg, Belt Ry. of Chicago, Polk and Dearborn Sts., Chicago.

CHIEF INTERCHANGE CAR INSPECTORS' AND CAR FOREMEN'S SUPPLY MEN'S ASSOCIATION.—Bradley S. Johnson, W. H. Miner, Rookery Bldg., Chicago, Ill. Meeting with Chief Interchange Car Inspectors' and Car Foremen's Association.

CINCINNATI RAILROAD CLUB.—W. C. Cooder, Union Central Bldg., Cincinnati, Ohio. Meetings, 2d Tuesday in February, May, September and November.

DIXIE RAILWAY CLUB.—T. C. Schley, 71 Conti St., Mobile, Ala. Regular meetings, bi-monthly, second and fourth Fridays, Battle House Hotel, Mobile, Ala.

EASTERN RAILROAD ASSOCIATION.—E. N. Bessling, 614 F St., N. W., Washington, D. C.

FREIGHT CLAIM ASSOCIATION.—(See American Railway Association, Division VII.)

GENERAL SUPERINTENDENTS' ASSOCIATION OF CHICAGO.—C. H. Treichel, Grand Central Station, Chicago. Regular meetings, Wednesday, preceding 3rd Friday in month, Room 1414 Manhattan Bldg., Chicago.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' ASSOCIATION.—W. J. Mayer, Michigan Central R. R., Detroit, Mich. Annual convention, 1924, Chicago. Exhibit by International Railroad Master Blacksmiths' Supply Men's Association.

INTERNATIONAL RAILROAD MASTER BLACKSMITHS' SUPPLY MEN'S ASSOCIATION.—George P. White, 747 Railway Exchange, Chicago. Meeting with International Railroad Master Blacksmiths' Association.

INTERNATIONAL RAILWAY FUEL ASSOCIATION.—J. B. Hutchison, 6000 Michigan Ave., Chicago. Next convention, May 26-29, 1924, Hotel Sherman, Chicago. Exhibit by International Railway Supply Men's Association.

INTERNATIONAL RAILWAY GENERAL FOREMEN'S ASSOCIATION.—Wm. Hall, 1061 W. Wabash Ave., Winona, Minn.

INTERNATIONAL RAILWAY SUPPLY MEN'S ASSOCIATION.—Bard Browne, Superheater Co., 17 E. 42nd St., New York. Meeting with International Railway Fuel Association.

MASTER BOILER MAKERS' ASSOCIATION.—Harry D. Vought, 26 Cortlandt St., New York. Next convention, May 20-23, 1924, Hotel Sherman, Chicago.

MASTER CAR AND LOCOMOTIVE PAINTERS' ASSOCIATION.—(See A. R. A., Division V.)

MASTER CAR BUILDERS' ASSOCIATION.—(See A. R. A., Division V.)

NATIONAL ASSOCIATION OF RAILWAY TIE PRODUCERS.—J. S. Penney, T. J. Moss Tie Company, St. Louis, Mo. Next convention, January 17-18, 1924, Muehlebach Hotel, Kansas City, Mo.

NATIONAL ASSOCIATION OF RAILWAY AND UTILITIES COMMISSIONERS.—James B. Walker, 49 Lafayette St., New York. Next Convention, Nov. 11, 1924, Phoenix, Ariz.

NATIONAL FOREIGN TRADE COUNCIL.—O. K. Davis, 1 Hanover Square, New York.

NATIONAL RAILWAY APPLIANCES ASSOCIATION.—C. W. Kelly, People's Gas Bldg., Chicago. Annual exhibition at convention of American Railway Engineering Association.

NATIONAL SAFETY COUNCIL.—Steam Railroad Section: E. R. Cott, Safety Agent, Hocking Valley Ry., Columbus, O.

NEW ENGLAND RAILROAD CLUB.—W. E. Cade, Jr., 683 Atlantic Ave., Boston, Mass. Regular meetings, 2d Tuesday in month, excepting June, July, August and September, Copley-Plaza Hotel, Boston, Mass.

NEW YORK RAILROAD CLUB.—Harry D. Vought, 26 Cortlandt St., New York. Regular meetings, 3rd Friday in month, except June, July and August, at 29 W. 39th St., New York.

PACIFIC RAILWAY CLUB.—W. S. Wollner, 64 Pine St., San Francisco, Cal. Regular meetings, 2d Thursday in month, alternately in San Francisco and Oakland.

RAILWAY ACCOUNTING OFFICERS' ASSOCIATION.—E. R. Woodson, 1116 Woodward Building, Washington, D. C.

RAILWAY BUSINESS ASSOCIATION.—Frank W. Noxon, 600 Liberty Bldg., Broad and Chestnut Sts., Philadelphia, Pa.

RAILWAY CLUB OF PITTSBURGH.—J. D. Conway, 515 Grandview Ave., Pittsburgh, Pa. Regular meetings, 4th Thursday in month, except June, July and August, Fort Pitt Hotel, Pittsburgh, Pa.

RAILWAY DEVELOPMENT ASSOCIATION.—(See Am. Ry. Development Assn.)

RAILWAY ELECTRICAL SUPPLY MANUFACTURERS' ASSOCIATION.—J. Scribner, General Electric Co., Chicago. Annual meeting with Association of Railway Electrical Engineers.

RAILWAY EQUIPMENT MANUFACTURERS' ASSOCIATION.—H. A. Varney, Sunbeam Electric Manufacturing Co., Evansville, Ind. Meeting with Traveling Engineers' Association.

RAILWAY FIRE PROTECTION ASSOCIATION.—R. R. Hackett, Baltimore & Ohio R. R., Baltimore, Md.

RAILWAY REAL ESTATE ASSOCIATION.—R. H. Morrison, C. & O. Ry., Richmond, Va.

RAILWAY SIGNAL ASSOCIATION.—(See A. R. A., Division IV, Signal Section.)

RAILWAY STOREKEEPER' ASSOCIATION.—(See A. R. A., Division VI.)

RAILWAY SUPPLY MANUFACTURERS' ASSOCIATION.—J. D. Conway, 1841 Oliver Bldg., Pittsburgh, Pa. Exhibit at A. R. A., Division V. convention, June 11-18, 1924, Atlantic City, N. J.

RAILWAY TELEGRAPH AND TELEPHONE APPLIANCE ASSOCIATION.—G. A. Nelson, 30 Church St., New York. Meets with Telegraph and Telephone Section of A. R. A., Division I.

RAILWAY TREASURY OFFICERS' ASSOCIATION.—L. W. Cox, Commercial Trust Bldg., Philadelphia, Pa.

ROADMASTERS' AND MAINTENANCE OF WAY ASSOCIATION.—P. J. McAndrews, C. & N. W. Ry., Sterling, Ill. Next convention, September 16-18, 1924, New York. Exhibit by Track Supply Association.

ST. LOUIS RAILWAY CLUB.—B. W. Frauenthal, Union Station, St. Louis, Mo. Regular meetings, 2d Friday in month, except June, July and August.

SIGNAL APPLIANCE ASSOCIATION.—F. W. Edmunds, Sunbeam Electric Manufacturing Company, New York City. Meeting with American Railway Association, Signal Section.

SOUTHERN AND SOUTHWESTERN RAILWAY CLUB.—A. J. Merrill, P. O. Box 1205, Atlanta, Ga. Regular meetings, 3d Thursday in January, March, May, July, September and November, Piedmont Hotel, Atlanta.

SOUTHERN ASSOCIATION OF CAR SERVICE OFFICERS.—J. L. Carrier, Car Serv. Agent, Tenn. Cent. Ry., 319 Seventh Ave., North Nashville, Tenn.

SUPPLY ASSOCIATION OF AMERICAN RAILWAY TOOL FOREMEN'S ASSOCIATION.—H. S. White, 9 N. Jefferson St., Chicago.

TRACK SUPPLY ASSOCIATION.—W. C. KIDD, Ramapo-Ajax Corporation, Hillburn, N. Y. Meets with Roadmasters' and Maintenance of Way Association.

TRAVELING ENGINEERS' ASSOCIATION.—W. O. Thompson, 1177 East 98th St., Cleveland, Ohio. Exhibit by Railway Equipment Manufacturers' Assn.

WESTERN RAILWAY CLUB.—Bruce V. Crandall, 605 North Michigan Ave., Chicago. Regular meetings, 3d Monday each month, except June, July and August.

WESTERN SOCIETY OF ENGINEERS.—Edgar S. Nethercut, 1735 Monadnock Bldg., Chicago, Ill.

Traffic News

The Cincinnati Chamber of Commerce will submit an ordinance to the city council, prohibiting the scalping of the return portions of excursion tickets in that city.

The Kansas Public Utilities Commission will make an investigation of intrastate freight rates on all railroads in the state. The date for the hearing will be set later.

The "Pittsburgher" is the name of a new through night passenger train of the Pennsylvania, between New York City and Pittsburgh, which will be put in service on January 14. The time of train No. 37, the Iron City Express, will at the same time be shortened.

The airplanes carrying mail to and from California have suspended operations until January 1, according to a press dispatch from Reno, Nevada. It is said that this suspension of mail traffic has been ordered out of respect to the memory of four pilots who were killed this year.

T. R. Driver has been appointed dairy agent of the Missouri Pacific in Kansas. His duties will be to work with dairy farmers, business men and bankers and to co-operate with the Kansas State Agricultural College at Manhattan and other agencies interested in the growth of dairying in the state.

The "cow, sow and hen special" is the name of a demonstration train which is to be run over the Santa Fe lines, starting at Bellville, Tex., on January 8, for a trip through Texas, Louisiana and New Mexico, to demonstrate diversified farming. The train will stop at 159 points along the lines, the last of which will be Raton, N. Mex., on February 26.

The Chicago, Burlington & Quincy has traded 58 pure bred bulls and boars of an aggregate value of $10,000 with farmers along its lines in Colorado for a number of scrubs whose value approximated $500, the farmers being obligated to keep the better stock at least two years. The pure blood stock was exhibited on the "Pure Bred Sires Special" which was operated by the Chicago, Burlington & Quincy recently.

The Chicago, Milwaukee & St. Paul is operating a special car bearing an agricultural and horticultural exhibit of Benewah county and eastern Washington to show middle western farmers the results of raising diversified crops. The car left St. Maries, Idaho, on November 22 for a three months' trip through Montana, the Dakotas and other mid-western states traversed by the Chicago, Milwaukee & St. Paul.

Hugo Oberg, who has recently resigned as traffic assistant to the director general of railroads and who was formerly for several years a member of the board of suspension and the fifteenth section board of the Interstate Commerce Commission, announces the organization of the Capital Traffic Service Bureau, with office at Room 803, Transportation building, Washington, specializing in traffic matters before the Interstate Commerce Commission.

The Mississippi-Warrior Barge Line has announced a reduction in its through rates from St. Louis, Mo., to points on the Mobile & Ohio in Mississippi and Alabama, including the Birmingham district via Memphis, Tenn., whereby the new water-rail rates will be 24.5 cents lower per 100 lb. than the all-rail rates on first class freight, 21 cents on second class, 18.5 cents on class 3, 15.2 cents on class 4, 12.5 cents on class 5, and 10.5 cents on class 6.

The Chicago, Rock Island & Pacific will inaugurate through standard sleeping car service between Memphis, Tenn., and Los Angeles, Cal., on December 30. A new train, to be known as the Memphis-Californian, will leave Memphis at 2:30 p. m., arriving at El Paso, Tex., at 6:30 a. m., the second morning, and at Los Angeles, Cal., at 7:50 a. m., the third morning. Returning, it will leave Los Angeles at 5 p. m., and arrive at Memphis at 3:45 p. m., the third day.

The Union Pacific, the Chicago, Burlington & Quincy, the Chicago & North Western and the Chicago, Rock Island & Pacific

filed an appeal in the State Supreme Court of Nebraska on December 16 against the ruling handed down by the district court of Lancaster county, Nebr., prohibiting the granting of passes to ministers of the gospel and charity workers. The district court held that the act of the legislature, permitting the giving of transportation was arbitrary and discriminatory, constituting class legislation.

Two daily fast through freight trains from the Central West to Carolina territory have been put on by the Southern Railway. One comes from East St. Louis and Louisville; the other from Cincinnati. Both run via Danville, Ky.; Harriman, Tenn., and Knoxville to Asheville, where they are broken up. These trains are handled like passenger trains, without switching at intermediate terminals. Freight leaving East St. Louis 7 p. m. Monday, Louisville 5:30 p. m. Tuesday, Cincinnati 10 p. m. Tuesday, reaches Knoxville Wednesday afternoon and Asheville early Thursday morning.

Bogus Passenger Tickets

The Railway Ticket Protective Bureau, Chicago, has issued a bulletin suggesting to conductors, gatemen and train ticket auditors the arrest of any person presenting a fraudulent skeleton coupon ticket purporting to be issued by the Erie & Michigan Transportation Company which is a non-existent company. Tickets of this form have been recently offered for transportation on several roads. They are printed on gray-white plain paper without water marks. The printing is from ordinary type such as is found in any local print shop and the number of the ticket is imprinted by a rubber stamp with red ink. The agent's stamp on the back of the ticket reads, "E & M Trans. Co., Erie, Pa.," with the date of sale in the center. Several tickets brought to the attention of the bureau have also borne a line to the effect that the coupon, after being punched by the conductor, is to be left in the hands of the holder. An "L" punch is used to cancel dates and the destination, and the routing of the tickets is inserted with pen and ink. The tickets so far reported have been used only in the south, southwestern and middle west.

Anthracite Shipments in November

Shipments of anthracite for the month of November, as reported to the Anthracite Bureau of Information, Philadelphia, amounted to 5,828,754 gross tons, as compared with 6,564,526 gross tons in October, a decrease of 735,772 tons, or 11 per cent. The average daily shipment for the time the collieries were in operation during the month of November, exceeded that for the month of October. Comparing November shipments of this year with the corresponding month in 1921, the latest normal year, an increase of 514,740 tons is shown, or 9.7 per cent. Shipments by originating carriers were as follows:

	November 1923	November 1922	November 1921	October 1923
Phila. & Reading	1,038,340	1,224,990	1,017,409	1,205,425
Lehigh Valley	1,006,983	1,109,449	913,737	1,174,768
Central of N. J.	493,915	583,835	512,613	564,471
Dela., Lackawanna & W.	937,222	896,182	814,131	1,017,231
Delaware & Hudson	820,301	876,861	756,598	861,705
Pennsylvania	509,457	546,214	429,638	576,345
Erie	623,101	706,747	503,488	707,076
N. Y., Ontario & W.	153,075	161,660	136,945	174,707
Lehigh & N. E.	246,360	314,164	229,455	282,798
	5,828,754	6,420,102	5,314,014	6,564,526

THE KNOXVILLE & CAROLINA RAILROAD is not a very large institution; it extends eastward from Knoxville, Tenn., 30 miles, to Sevierville, county seat of Sevier County; but its officers are doing their part in one of the necessary duties resting on all railroads to educate the public on the subject of safety at highway grade crossings. They have entered suit against the Neubert Springs Hotel & Water Company for $2,500 damages; which damages were caused when a truck belonging to the hotel company caused the derailment of a locomotive on a crossing. This collision occurred at a crossing, a few miles out of Knoxville, on August 28.

Commission and Court News

Interstate Commerce Commission

The Interstate Commerce Commission has issued a decision finding that rates from Kansas City, St. Louis, Memphis and New Orleans and points in defined territories related to or based thereon and Atlantic seaboard territory to Marshall and Jefferson, Texas, are unduly prejudicial to those points and unduly preferential of Shreveport, La. Rates from the points described to Marshall and Jefferson are found unreasonable to the extent they exceed the aggregate of intermediate rates.

The Interstate Commerce Commission has rendered its decision in the Michigan Traffic League case, which was submitted on February 28, in which it finds that class rates and commodity rates bearing a direct relation thereto between points in the lower peninsula of Michigan north of the main line of the Michigan Central and points in Central Freight Association territory are unreasonable and unduly prejudicial. The commission prescribed as reasonable for the future a scale of rates based on the distance scale of rates applying between points in Central Freight Association territory with certain zone differentials. Commissioners Hall and Potter dissented.

State Commissions

The Alabama Public Service Commission has postponed until January 14 its proposed hearing on various amendments to the general state freight tariff which the commission desires to have adopted.

Court News

Construction of Boiler Safety Appliance Act

In a fireman's action for injuries from a fall caused by the shaker bar slipping off the lever, the Texas Court of Civil Appeals holds that under the Boiler Safety Appliance Act the railway company is under the absolute duty to keep the shaker bar in proper condition and safe to operate, so that it may be used by the employee without unnecessary peril to life or limb. No rule has been promulgated by the Interstate Commerce Commission as to how tight the shaker bar must fit over the end of the lever attached to the grates, so that the railroad must exercise its common-law duty in selecting the appliance.—Davis v. Callen (Tex. Civ. App.), 250 S. W. 305.

Deduction from Wages for Absence on Election Day

The Illinois Supreme Court holds that the act of June 22, 1891, Section 25, as amended (Hurd's Rev. St. 1917, C. 46, Section 312), in so far as it forbids the employer to make deduction from an employee's wages because of his absence for two hours on election day for voting, deprives employers of their money and property without due process of law, and denies them the equal protection of the laws, in violation of the state and federal constitutions, and is not a valid exercise of the police power as tending to promote the health, safety or morals of employees, or the public comfort, welfare, safety, or morals.—People v. Chicago, M. & St. P., 206 Ill. 486, 138 N. E. 155.

Railroad Not Liable for Injuries Due to Defective Car Selected by Shipper

If a shipper selects a car with knowledge of its defects the carrier will not be liable for injuries resulting therefrom. Where a car containing stock feed, plainly marked as having a leaky roof, was delivered to a terminal company and from that company to the Burlington, where it remained on the track several hours subject to shipper's order, who then offered it to the Chicago Great Western for transportation, it was held that this was an unmistakable indication that the shipper desired the feed transported in the car in which it was then loaded, and he could not

recover for injuries resulting from the defect.—Schreiber Milling & Grain Co. v. Chicago Great Western (Mo. App.), 246 S. W. 647.

Negligence Where Matter of Speculation—Cinder in Passenger's Eye

In an action for injuries to a passenger, alleged to have been caused by the opening of the front door of a coach as the train entered a tunnel, so that a cinder got in the passenger's eye, there being no evidence that a cinder entering by the door was more likely to lodge in the eye than one entering by an open window, as to which no negligence was alleged, the Kentucky Court of Appeals holds that whether the injury was caused by the railroad's negligence was merely a matter of speculation and doubt and a verdict should have been directed for the defendant.—L. & N. v. Fields (Ky.), 246 S. W. 130.

Decisions Under Federal Employers' Liability Act

An interstate railroad company's employee, injured while assisting in rerailing a derailed car which blocked cars used in interstate commerce, was held within the act.—Shaffer v. W. M. (W. Va.), 116 S. E. 747.

An employee, while removing a spike from a switch preliminary to the movement of a draft of 14 cars of coal, was run over by the cars. All the cars had reached their destination, Perth Amboy, and were out of interstate commerce, except one, consigned to Perth Amboy Piers, a mile and a half beyond. The Court of Appeals, Third Circuit, holds that the plaintiff was engaged in interstate commerce.—Lehigh Valley v. Doktor, 290 Fed. 760.

Damages for Delay at Canadian Boundary by Customs Bureau Not Recoverable from Carrier

The Minnesota Supreme Court holds that damages caused by delay in the shipment of freight from Canada to Minneapolis at the international boundary, because of the failure to obtain an immediate transportation entry, permitting it to proceed to Minneapolis before valuation and payment of duty, the Customs Bureau to which the freight was consigned "for customs purposes only" declining to make entry without payment or guaranty of its charges, of which the shipper was given timely notice by the carrier, cannot be recovered of the carrier.

"A carrier need not engage in controversy with the customs officers, nor pay the charge of the broker for making the entry and be put to a dispute with the shipper over their validity. It discharges its duty if it gives its consignor the right to pay charges exacted."—Van Dusen-Harrington Co. v. Canadian Pacific (Minn.), 191 N. W. 411.

P. & A.

A Contributory Cause of the Twentieth Century Collision

Wreck of Automobile, Stalled on Highway Crossing, Which Was Hit by the First Section and the Flames From Which Caused the Second Section to Stop, Allowing Third Section to Overtake It.

Labor News

M. J. Murphy, vice-president of the Brotherhood of Railroad Trainmen, with headquarters at Cleveland, Ohio, has resigned.

The first bank to be owned and operated by a labor organization in the New England states will be opened by the Brotherhood of Locomotive Engineers in Boston, Mass., on February 1, 1924. The bank will be known as the Brotherhood of Locomotive Engineers Trust Company of New England.

The Brotherhood of Railway Clerks' National Bank of Cincinnati, Ohio, was opened in the new Brotherhood building on December 14. The capital of the bank is $200,000 and the surplus $50,000. It is reported that one of the first accounts opened in the new bank was that of the Baltimore & Ohio Railroad, which deposited $50,000.

The strike of the employees of the Missouri & North Arkansas, which began in the early part of 1921, was officially ended on December 21, as a result of an agreement reached in the circuit court at Little Rock, Ark. The agreement dismisses criminal charges pending against strikers alleged to have been involved in burning bridges and other acts of sabotage. Two strikers, now serving seven-year sentences for the burning of a railway bridge, will also be pardoned.

The strike of shopmen on the Atchison, Topeka & Santa Fe, which began with the general shopmen's strike on July 1, 1922, was officially declared at an end on December 1, by order of the Railway Employees' Department of the American Federation of Labor. It is understood that no settlement was made between officers of the labor organization and the road, reports indicating that the strike was called off on the initiative of the labor union. At Topeka, Kan., the strikers have ignored the order of the national labor organization, denying the authority of the official notice.

Wage Increases to Longshoremen

The Railroad Labor Board has ordered increases in the wages of employees of the Pere Marquette at Ludington, Mich., represented by the International Longshoremen's Association. The rates which have been fixed are: checkers, 59 cents an hour; callers, 55 cents an hour; stowers and coopers, 55 cents an hour; sealers, 54 cents an hour, and truckers, 53 cents an hour. Several disputed rules were also established by the board.

New York Unions Refuse to Support Engineers' Holding Company

The Brotherhood Investment Company, a twenty-million-dollar holding company now being financed by the Brotherhood of Locomotive Engineers in New York, will not be supported by the local unions affiliated with the Central Trades and Labor Council of that city. Delegates to the meeting of the council on December 20 adopted a resolution advising of this action and charging the engineers' brotherhood with the policy of open antagonism against the American Federation of Labor. Credentials have been refused the solicitors of the Brotherhood of Locomotive Engineers who wanted to appear before the 700,000 union workers affiliated with the Central Trades and Labor Council in the New York district to sell their securities.

The Brotherhood Investment Company is one of the many financial ventures of the engineers' brotherhood. It is a combined holding company for bank and trust companies' stocks and deals in investment bonds. The brotherhood holds 51 per cent of the common stock.

The Brotherhood of Locomotive Engineers' Co-operative Trust Company of New York was opened on December 29. Although brotherhood officers have been for some time part owners of another New York bank, the one just opened is the first typical brotherhood bank to be opened in that city.

Labor Board Decisions

Violations of Decisions

The Railroad Labor Board has found that the Erie has wilfully violated Decision No. 1218, and that the Pennsylvania has wilfully violated Decision No. 1063, and that both roads are persisting in such violations.—*Decisions No.* 2054 *and* 2055.

Bulletining of Positions

The Railroad Labor Board, in a decision on a controversy between the Brotherhood of Railway and Steamship Clerks and the American Railway Express Company, sustained the position of the employees in ordering that the phrase "Description of Position" in Rule 10 requires the road to show the hours of service in the bulletin of a vacancy. The contention of the company was that the phrase, "Description of Position," is complied with when the duties of the position and the starting time are shown.—*Decision No.* 2058.

Changing Positions in Telegraphers' Schedule

In a dispute between the Order of Railroad Telegraphers and the Atchison, Topeka & Santa Fe over the action of the road in abolishing positions listed in the telegraphers' schedule and creating other positions in lieu thereof at a lesser rate of pay, the Labor Board has decided that the changing of positions from telegrapher to telephoner does not create new positions nor change the duties of the employee filling such a position. It has ordered that the Santa Fe restore the rates of pay in effect prior to the reduction retroactive to the date the reduction was made.—*Decision No.* 2051.

Compensation for Clerks on Holidays

In a dispute between the Brotherhood of Railway & Steamship Clerks and the Maine Central and the Portland Terminal over the payment of wages for holidays when service is not performed on such days, the Labor Board ruled for the employees. In its decision it ordered that the full day period rule for holidays, providing for pro-rata hourly rate on the number of hours worked, shall be supplemented by the following paragraph: "The above shall not operate to change the practice previously in effect of paying employees for the specified holidays when not worked."—*Decision No.* 2037.

Wages on the Western Allegheny Railroad

The Labor Board has ordered that rate of pay and overtime conditions for the employees on the Western Allegheny shall not be less favorable than the rates of pay and overtime conditions established in its previous general wage and rule decisions. This decision was handed down in a dispute between a committee representing 100 or more unorganized employees of the Western Allegheny and the management of the road. The road reduced the wages and changed the overtime payments of certain of its employees on May 16, 1921, while the wage question was pending before the Labor Board, without a conference or agreement with its employees. The reductions were made due to the inability of the road to continue payment of the higher rates.—*Decision No.* 2033.

Clerks' Election on Erie

In a dispute between the Brotherhood of Railway and Steamship Clerks and the Erie on the question of recognition of the organization as the accredited representative of employees in clerical and station service on the road, the Labor Board has ordered that an election be held to determine the wishes of the employees on the question. The Labor Board also ordered that rules agreed upon in the conferences between the organization and the road in June and July, 1921, together with the rules promulgated by the board in Decision No. 630, constitute an agreement between this organization and carrier, and that this agreement shall continue in effect until changed in accordance with the terms of the agreement and provisions of the Transportation Act. In the conferences in 1921, 42 rules were agreed to and 19 were not agreed to. The latter were disposed of by the board in Decision No. 630, but the management would not approve of the completion of the agreement and subsequently took the position that the organization did not represent the majority of its clerical employees.—*Decision No.* 2032.

C. & A. Ordered to Negotiate with A. F. of L. Unions

The Shop Employees' Association of the Chicago & Alton, which was formed by the shop workers subsequent to the shopmen's strike in 1922, has been ruled out by the Labor Board as the authorized representative of the shopmen on the road, and the Chicago & Alton has been ordered to negotiate changes in the shopcrafts agreement now in effect with the committee of the shop employees represented by System Federation No. 29 of the Railway Employees' Department, American Federation of Labor. Of the 2,700 mechanical department employees in the service of the Alton there are approximately 15 now in service who participated in the formation of the association last year, according to testimony. In its decision, the board ordered that, if a question arises relative to the right of the Federated Shop Crafts to represent the shop employees on the Alton, arrangements shall be made to take a secret ballet to determine the wishes of such employees definitely.—*Decision No.* 2024.

Election of Employee Representatives Under Labor Board Orders

In two addenda to previous decisions, the Railroad Labor Board has ordered that in case one or more of the interested parties in an election of employee representatives ordered by the board should decline to participate therein, the employees are nevertheless entitled to an election. In one instance, the Gulf Coast Lines and the Houston Belt & Terminal refused to participate in an election ordered by the board in Decision No. 1838 on petition of the Railway Employees' Department of the American Federation of Labor. The Great Northern also declined to participate in an election ordered by Decision No. 1947, also on petition of the Railway Employees' Department of the American Federation of Labor. In both instances, the board has ordered that if the representatives of the road decline to assist in holding the election, the representatives of the employees who desire to participate in the election shall arrange the details of the ballot, giving due notice to any other organizations comprising employees of this class of the date of election and taking other precautions for a fair election.—*Addendum No.* 1 *to Decision No.* 1838 *and Addendum No.* 1 *to Decision No.* 1947.

Wage Rates on Holidays

In a controversy between the Order of Railroad Telegraphers and the Boston & Maine in regard to whether, under the application of Rule 8, Decision No. 757, other than pro-rata rates should be paid when the hours of duty on holidays are different from week days, the Railroad Labor Board has upheld the claim of the employees for rates higher than the ordinary rates. The employees' contention was that Rule 8 of Decision No. 757, is plain in its meaning; that paragraph 2 of this rule says that employees shall be paid the regular hourly rates for the entire number of hours constituting the regular week-day assignment. Any deviation from this would be subject to the third paragraph of Rule 8, which provides for time worked before and after the limits of the regular week-day assignment, and such time would either constitute a call or come under the overtime rule, according to the employees' argument. The contention of the management was that, where on Sundays and holidays the entire number of hours constituting the regular week-day assignment are worked, even though the starting and finishing time is different from such times on week days, pro-rata rates should be paid. It further claimed that, if the Labor Board intended in Rule 8 that in order for the entire number of hours worked on Sundays and holidays to be paid for at pro-rata rates, they should be the same as week-day hours, different language would have been used.—*Decision No.* 2060.

THE GREAT NORTHERN and the Northern Pacific have secured a permanent injunction against the State of North Dakota in the federal district court at Fargo, N. Dak., enjoining the state from the collection of their 1922 income taxes. The assessments levied against the Great Northern were $28,076 and against the Northern Pacific $32,026.

Equipment and Supplies

Locomotives

THE CANADIAN PACIFIC is inquiring for from 10 to 15 Mikado type locomotives.

THE VALLEY & SILETZ has ordered one locomotive from the H. K. Porter Company.

THE CHEROKEE COMPANY has ordered one Shay type locomotive from the Lima Locomotive Works.

THE TEXAS-MEXICAN has ordered from the Baldwin Locomotive Works a 4-6-0 type locomotive.

THE ARGENTINE STATE RAILWAY has ordered 5 Mikado type locomotives from the Baldwin Locomotive Works.

THE SAN JOAQUIN & EASTERN has ordered one Prairie type locomotive from the Baldwin Locomotive Works.

THE WEBB LOGGING & TIMBER COMPANY has ordered one 90-ton Shay locomotive from the Lima Locomotive Works.

THE MOBILE & OHIO, reported in the *Railway Age* of December 8 as inquiring for three Pacific type locomotives, has ordered two Pacific type locomotives from the Baldwin Locomotive Works.

THE TOLEDO, ANGOLA & WESTERN, reported in the *Railway Age* of October 20 as contemplating the purchase of a Mikado type locomotive, has ordered this equipment from the American Locomotive Company.

Freight Cars

RUTLAND RAILROAD.—See New York Central.

THE NORTHERN PACIFIC is inquiring for 200 ore cars of 75 tons' capacity.

THE WESTERN PACIFIC is inquiring for 200 ore cars of 70 tons' capacity.

THE DOLESE BROTHERS COMPANY, Chicago, is inquiring for 20 rock cars.

THE NEW YORK CENTRAL contemplates buying 500 sheathed box cars for the Rutland Railroad.

THE INTERSTATE PUBLIC SERVICE COMPANY, Indianapolis, Ind., has ordered 10 stock cars from the American Car & Foundry Company.

THE WESTERN PACIFIC, reported in the *Railway Age* of November 24, as inquiring for 200 automobile cars has ordered this equipment from the Standard Tank Car Company.

THE SOUTHERN PACIFIC has awarded contracts for the construction of the following cars: 2,975 box to the Standard Steel Car Company; 450 flat, 250 stock and 500 tight bottom gondola cars to the Ralston Steel Car Company; 200 oil tank cars to the General American Tank Car Corporation; 600 drop bottom gondola cars to the General American Car Company; 500 automobile cars to the Pullman Company. The Southern Pacific will build in its own shops 500 flat, 500 logging and 75 caboose cars.

Passenger Cars

THE GREAT NORTHERN has ordered a Brill model 55 gasoline car from the J. G. Brill Company.

THE CANADIAN PACIFIC has ordered 10 steel frames for passenger coaches from the National Steel Car Corporation.

THE INTERSTATE PUBLIC SERVICE COMPANY, Indianapolis, Ind., has ordered three sleeping cars and two buffet parlor cars from the American Car & Foundry Company.

THE SEWELL VALLEY has ordered from the J. G. Brill Company three Brill model 55 gasoline cars, two of which will be combination and baggage type and the other a straight baggage car.

THE BALTIMORE & OHIO, reported in the *Railway Age* of November 3 as inquiring for 50 coaches and 4 dining cars has ordered 50 coaches and 5 dining cars from the Pullman Company. This information has not as yet been officially confirmed.

Machinery and Tools

THE NORTHWESTERN PACIFIC has ordered a 15-ton electric traveling crane from the Whiting Corporation.

THE PERE MARQUETTE has ordered eight jib cranes of from one to six tons' capacity from the Whiting Corporation.

Signaling

Automatic Crossing Interlocking at Winnipeg

The Winnipeg Electric Railway, Winnipeg, Manitoba, has placed orders with the Union Switch & Signal Company for the materials for signaling at four crossings with steam railroads: Notre Dame Avenue, where two of the crossings are involved, (a) the Canadian Pacific and (b) the Midland and Canadian Pacific; Academy Road, two crossings, (a) the Midland and the Canadian Pacific, and (b) the Canadian National. Light signals, with automatic control, are employed, except on the Canadian Pacific at Notre Dame Avenue, where automatics are now in service, and style "S" semaphore signals will be used. The field installation will be made by the electric railway company's regular forces. No protection is provided for the vehicular traffic over these crossings. Normally, the signals on the steam line indicate stop and are cleared by the entrance of a train on the approach track circuit in the rear of the signal, provided a train on the Winnipeg Electric has not already accepted the signal. Signals on the electric line are normally at clear, but assume the stop position as soon as a railroad train enters on the approach section. A train approaching a signal on the electric line, finding it at clear, proceeds over the crossing, holding the signals on the steam line to stop from the time it passes the signal until it passes off its own track circuit. This scheme gives the steam line the preference by means of the preliminary track circuit in rear of the signal.

THE PUBLIC SERVICE COMMISSION of Pennsylvania announces that it has rescinded its rule prohibiting the granting of reduced railroad fares to clergymen.

P & A

Presidents of Railroad Unions Who Called at White House Recently—Left to Right: W. J. Johnston, E. J. Manion, E. B. Robertson, L. E. Sheppard and Timothy Healy

Supply Trade News

The **Bucyrus Company,** South Milwaukee, Wis., is preparing plans for an addition to its plant at Evansville, Ind.

The **Chicago Pneumatic Tool Company** is preparing plans for a three-story brick and steel factory to cost approximately $50,000, at Cleveland, Ohio.

The **Chicago Pneumatic Tool Company,** New York, has appointed the **General Machinery Company,** Spokane, Wash., as its agent in the eastern part of Washington and northern Idaho.

The **Lehon Company,** Chicago, manufacturers of Mule-Hide roofing, has removed its New York City office from 1 Liberty street to 95 Liberty street. This office is in charge of **F. T. Carpenter.**

The O'Fallon Railroad Supply Company, St. Louis, Mo., has been appointed representative in the southwestern territory for the **Burden Iron Company Railroad and Steamship Division,** St. Louis.

W. G. Cook, manager of the Chicago and Philadelphia offices of the Garlock Packing Company, has become associated with the **Union Asbestos & Rubber Company** and will represent this company in the East with headquarters at Philadelphia, Pa.

J. F. Farrell, general manager and a director of the **Nathan Manufacturing Company,** New York, has been elected vice-president; **Alfred Nathan, Jr.,** secretary, has been elected treasurer and **Edwin F. Wallace** has been elected secretary, all with headquarters at New York City.

The Chicago Bearing Metal Company and the **Bostwick Lyon Bronze Company** have been merged and the operation of both plants are under the supervision of William S. Bostwick and Chester A. Lyon. These companies make journal boxes and locomotive brasses and have plants at Chicago, Ill., Waynesboro, Pa., Hagerstown, Md.

A. E. Ostrander, formerly in charge of engineering for the **American Car & Foundry Company,** who has been on a leave of absence since early in 1922, has returned to work and on December 17 was transferred to the sales organization with the title of assistant vice-president and with headquarters at New York City. Mr. Ostrander is in charge of the miscellaneous sales department and will also handle special sales duties as may be assigned. He was born in New Haven, Conn., and began his career with the New York, New Haven & Hartford, serving in various capacities in the operating and mechanical departments of that road. He later entered the service of Cornelius Vanderbilt in New York City and from there went with the mechanical department of the Standard Steel Car Company, at Pittsburgh. In 1903 he came to the New York office of the American Car & Foundry Company, serving successively as draftsman, estimator, chief estimator and assistant mechanical engineer. In 1915 he was appointed mechanical engineer and in 1918 general mechanical engineer with headquarters in New York.

A. E. Ostrander

Railway Construction

ATCHISON, TOPEKA & SANTA FE.—This company plans the construction early next year of subways for street traffic under its tracks at Ervay and Hardwood streets, Dallas, Tex.

ERIE.—This company plans the construction of a freight terminal with freight transfer house, yards and related facilities between Griffith, Ind., and Highlands.

ERIE.—This company and the municipal authorities of Paterson, N. J., have entered into an agreement covering the elimination of grade crossings in that city by the railroad in the expense of which there would be some participation by the city. The contract has yet to be approved by the state utilities commission but, if this approval is secured, work will be started soon. The expenditure involved will probably be upwards of $3,000,000.

GRAND TRUNK.—This company is considering plans, drawn up jointly with the city of Lansing, Mich., for the elimination of grade crossings in that city. The plans call for the elevation of the Grand Trunk tracks approximately eight feet, and a similar depression of the streets crossing the tracks.

KANSAS CITY SOUTHERN.—This company contemplates the construction of viaducts and other line improvements at Shreveport, La.

NORTHERN PACIFIC.—This company has announced a construction program which will entail the expenditure of $57,000,000 during the next three years. Included in the plans of the company, in addition to the work reported in the *Railway Age* of December 15, is the construction of second track between the following points: Eldredge, N. Dak., to Windsor, nine miles; Laurel, Mont., to Park City, seven miles; Mission, Mont., to Livingston, five miles; Superior, Wis., to Anton, seven miles; Pasco, Wash., to Ainsworth Junction, two miles, and Great Northern Crossing, Mont., to Austin, ten miles. Additional yard tracks are planned on the Yellowstone division and the Pasco division and in the Glendive, Forsyth and Kootenai yards. New yards will also be constructed at Everett, Wash., St. Paul, Minn., and Jamestown, N. Dak. Grade separations planned for the next three years will cost $1,550,000. Among the buildings which are planned are storehouses at Duluth, Minn., Staples, Dilworth and Billings, Mont. Car shops will be constructed at St. Paul and Glendive, and power plants will be erected at St. Paul, Brainerd, Minn., Mandan, N. Dak., and Missoula, Mont. Commissary buildings will be constructed at Staples, Minn., and Laurel, Mont., and a boiler and tank shop will be erected at Livingston, Mont. The estimated cost of new passenger stations and improvements to existing stations is $750,000.

PACIFIC ELECTRIC.—This company has been authorized by the Railroad Commission of California to construct a subway from its Hill Street Terminal to Glendale boulevard, Los Angeles, Cal., a distance of one mile, and to improve the Hill Street Terminal, at a total cost of $3,000,000. Plans for the work have been completed and construction will start within 60 days.

ST. LOUIS-SOUTHWESTERN.—This company, jointly with the St. Louis-San Francisco, plans the remodeling and enlarging of the union passenger station at Jonesboro, Ark.

SEABOARD ELECTRIC RAILWAY.—This company, of which J. H. Thompson, Houston, Texas, is the organizer, plans the construction of an electric interurban line from Houston to Seabrook, a distance of 30 miles.

SOUTHERN.—This company has applied to the Interstate Commerce Commission for a certificate authorizing the construction of a cut-off line from Bulls Gap to Leadvale, Tenn., 17.12 miles, which will reduce the ruling grade from 1.5 to .6 per cent.

SOUTHERN PACIFIC.—This company has awarded a contract to the Utah Construction Company, San Francisco, Cal., for the construction of tunnels for the new second track in the Sierra Nevada mountains to cost $400,000.

Railway Financial News

BANGOR & AROOSTOOK.—*Equipment Trusts Sold.*—Estabrook & Co. have sold at prices ranging from 100.16 and dividend to 100.73 and dividend, to yield 5 per cent to 5.40 per cent, according to maturity, $360,000 5½ per cent equipment trust coupon notes, series "I." These notes, dated May 1, 1923, and due May 1, 1924, to 1933, have been authorized by the Interstate Commerce Commission.

BOSTON & MAINE.—*Approves Bond Issue.*—The stockholders at a special meeting in Boston on December 20 voted unanimously to approve the issuance of $7,000,000 worth of bonds, bearing 6 per cent interest, to secure a loan of similar amount recently authorized by the Interstate Commerce Commission. The Public Utilities Commission has also approved the proposed issue. The proceeds of the bonds are to be used as follows: $1,106,000 for the purchase of new equipment, and $5,894,000 to meet the expense incurred by improvements, betterments and additions to the road. The issue of $1,106,000 is to mature January 1, 1928, and the issue of $5,894,000 on January 1, 1934.

CHICAGO & NORTH WESTERN.—*Equipment Trust Certificates Authorized.*—The Interstate Commerce Commission has authorized an issue of $7,640,000 of equipment trust certificates to be sold at 97½ and interest.

CHICAGO, BURLINGTON & QUINCY.—*Asks Authority to Issue Bonds.*—The Interstate Commerce Commission has been asked to authorize an issue of $43,000,000 of first and refunding mortgage bonds, of which $20,000,000 is to pay for additions to betterments and equipment during 1924 and $23,000,000 to be held in the treasury subject to further order of the commission.

CHICAGO, ROCK ISLAND & PACIFIC.—*Authorized to Acquire Control.*—The Interstate Commerce Commission has authorized the acquisition of control of the Keokuk & Des Moines by lease.

The Rock Island has also been authorized to issue $452,000 of first and refunding mortgage gold bonds for the purpose of acquiring by purchase approximately 14.95 miles of railroad in Tillman County, Okla., owned by the Rock Island & Oklahoma. The acquisition of the road was also authorized.

DELAWARE & HUDSON.—*Asks Authority to Abandon Branch.*—This company has applied to the Interstate Commerce Commission for authority to abandon its Mooers branch, extending from a point in Chazy, N. Y., through Mooers and to the Canadian boundary, 12.76 miles.

DENVER & RIO GRANDE WESTERN.—*Authorized to Operate Line.*—The Interstate Commerce Commission has issued a certificate authorizing the receiver to acquire and operate a line from Kebler No. 2 station on its Loma branch to Alamo, 4.18 miles.

ERIE.—*Equipment Trust Certificates Authorized.*—The Interstate Commerce Commission has authorized an issue of $1,500,000 equipment trust certificates to be sold at not less than 97.

KEOKUK & DES MOINES.—*Lease.*—See Chicago, Rock Island & Pacific.

MICHIGAN CENTRAL.—*Ten Per Cent Common.*—This company has declared a dividend of 10 per cent on the common stock, payable January 29 to holders of record December 28. This is the same dividend as was paid for the first half year. In January, 1923, a semi-annual dividend of 4 per cent and an extra of 6 per cent were paid. Previously the rate had been 4 per cent.

MOBILE & OHIO.—*Asks Authority for Equipment Trust Certificates.*—The Interstate Commerce Commission has been asked to authorize an issue of $1,678,000 of 5 per cent equipment trust certificates, which have been sold to Clarke, Dodge & Co., New York, at 95½ and interest.

Dividend Declared.—A dividend of 3½ per cent has been declared, payable December 29 to stock of record December 17. A similar dividend was declared six months ago and this makes a total of 7 per cent for the year 1923, compared with the previous annual basis of 4 per cent.

NEW YORK, NEW HAVEN & HARTFORD.—*Asks Authority to Abandon Line.*—This company and the Old Colony have filed a joint application with the Interstate Commerce Commission for authority to abandon the Shawmut branch from Harrison Square to Mattapan, Mass., 4.2 miles.

OLD COLONY.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to issue $3,500,000 of 5½ per cent mortgage bonds under the terms of the lease to the New York, New Haven & Hartford, to be sold to R. L. Day & Co.

PELHAM & HAVANA.—*Asks Authority to Abandon Line.*—The receivers applied to the Interstate Commerce Commission for authority to abandon the entire line extending from Cairo, Ga., to Havana, Fla., 25½ miles.

SEABOARD AIR LINE.—*Asks Authority for Equipment Trust Certificates.*—This company has applied to the Interstate Commerce Commission for authority for an issue of $1,620,000 of 6 per cent equipment trust certificates which have been sold to Freeman & Co. at 95½. It is proposed to sell 1,520 cars in need of rebuilding to the Seaboard Equipment Company, which will rebuild them.

SEABOARD AIR LINE.—*Adjustment Mortgage Interest.*—The 2½ per cent interest on the $25,000,000 adjustment 5 per cent mortgage bonds will be paid February 1, 1924, out of surplus, after charges, for the six months ended October 31, 1923. It will be applied on 1¼ per cent coupons 45 and 46, due August 1, 1921. This is the first payment since February 1, 1921, when the regular semi-annual payment of 2½ per cent was made for the six months ended October 31, 1920.

SOUTHERN.—*Asks Authority to Issue Bonds.*—The Interstate Commerce Commission has been asked for authority for the issue and sale of $1,025,000 of first consolidated mortgage 5 per cent gold bonds for the purpose of redeeming a like amount of 4 per cent bonds of the Washington, Ohio & Western.

TEXAS & PACIFIC.—*Stockholders Approve Plan.*—The stockholders have approved the reorganization plan outlined in the *Railway Age* of December 1, 1923, page 1038.

VIRGINIAN.—*Asks Authority to Issue Bonds.*—This company has applied to the Interstate Commerce Commission for authority to guarantee an issue of $1,796,000 of first mortgage 5 per cent gold bonds of the Virginian Terminal Railway, which the Virginian Terminal also asked authority to issue, and to nominally issue $3,416,000 of its own first mortgage 5 per cent 50-year gold bonds, and to issue and sell $5,000,000 of the same kind of bonds for advances for construction work on the Virginian Terminal. The bonds have been sold to Lee, Higginson & Co. and the National City Company at 91.

Dividends Declared

Baltimore & Ohio.—Common, 1¼ per cent, quarterly; preferred, 1 per cent, quarterly; both payable March 1 to holders of record January 12.

Bangor & Aroostock.—Common, 1¼ per cent, payable January 1 to holders of record December 27.

Boston, Revere Beach & Lynn.—1½ per cent, quarterly, payable January 2 to holders of record December 15.

Central of New Jersey.—$2, quarterly, payable January 15 to holders of record January 4.

Elmira & Williamsport.—Preferred, 3.22 per cent, payable January 2 to holders of record December 20.

Gulf, Mobile & Northern.—Preferred, 1 per cent, payable February 15 to holders of record February 1.

Louisville & Nashville.—2½ per cent, semi-annually, payable February 11 to holders of record January 15.

Northern of New Hampshire.—1½ per cent, quarterly, payable January 2 to holders of record December 10.

Norwich & Worcester.—Preferred, 2 per cent, payable January 2 to holders of record December 15.

Philadelphia & Trenton.—2½ per cent, quarterly, payable January 10 to holders of record January 1.

Providence & Worcester.—2½ per cent, quarterly, payable December 31 to holders of record December 12.

Trend of Railway Stock and Bond Prices

	Dec. 24	Last Week	Last Year
Average price of 20 representative railway stocks	59.55	59.01	64.88
Average price of 20 representative railway bonds	82.13	84.43	85.02

Railway Officers

Executive

F. **W. Sargent**, general solicitor of the Chicago & North Western, with headquarters at Chicago, has been promoted to vice-president and general counsel, with the same headquarters, succeeding **J. B. Sheean**, who has retired on account of ill health. Mr. Sheean was born on August 24, 1863, at Anamosa, Ia., and was graduated from the University of Michigan in 1885. He was admitted to the bar in 1888 and thereafter engaged in general law practice at Omaha, Nebr. He entered railway service in September, 1892, as an attorney for the Fremont, Elkhorn & Missouri Valley, now a part of the Chicago & North Western, at Omaha. He was promoted to assistant general attorney of the Chicago & North Western, with headquarters at Omaha, on February 28, 1903, and continued in this capacity until March 1, 1905, when he was appointed general attorney of the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at St. Paul, Minn. On March 1, 1910, Mr. Sheean was promoted to general solicitor. He held this position until October 1, 1918, when he was promoted to general counsel of both the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha, with headquarters at Chicago. On April 18, 1922, Mr. Sheean was elected vice-president and general counsel, with headquarters at Chicago, the position in which he has continued until his retirement. Fred W. Sargent was born on May 26, 1876, at Akron, Ia., and was graduated from the University of Iowa in 1901. After engaging for several years in the private practice of law, he entered railway service in 1906 in the legal department of the Chicago & North Western and the Chicago, St. Paul, Minneapolis & Omaha. In 1912 he was appointed attorney for the state of Iowa for the Chicago, Rock Island & Pacific, and he continued in this capacity until 1921 when he was appointed general solicitor for the Chicago & North Western, with headquarters at Chicago. Mr. Sargent held this position until his recent election as vice-president and general counsel, with the same headquarters.

F. W. Sargent

J. B. Sheean

Financial, Legal and Accounting

T. W. Burtness, office assistant to the president of the Chicago, Milwaukee & St. Paul, has been promoted to secretary succeeding **E. W. Adams**, retired.

R. N. Van Doren, assistant general solicitor of the Chicago & North Western, with headquarters at Chicago, has been promoted to general solicitor, with the same headquarters, succeeding **F. W. Sargent**, who has been elected vice-president and general counsel.

E. W. Adams, secretary of the Chicago, Milwaukee & St. Paul, with headquarters at Milwaukee, Wis., retired from active service on December 21. Mr. Adams was born on September 12, 1859, in Clayton county, Iowa. He entered railway service in 1897 as chief clerk in the office of the secretary of the Chicago, Milwaukee & St. Paul, at Milwaukee, Wis. In 1899 he was promoted to general right-of-way agent and in 1900, to assistant secretary. Mr. Adams was elected secretary in 1903 and continued in that capacity until his retirement.

Operating

W. P. Hayes, division engineer of the Louisiana division of the Missouri Pacific with headquarters at Monroe, **La.**, has been promoted to trainmaster with the same headquarters.

L. C. Sprague, superintendent of the Uintah Railway with headquarters at Mack, Colo., has been appointed acting general manager with the same headquarters succeeding **James E. Hood**, deceased.

J. E. Hutchinson, general manager of the St. Louis-San Francisco with headquarters at Springfield, Mo., has been promoted to vice-president in charge of operation to fill the vacancy created by the retirement of T. A. Hamilton in 1922. Mr. Hutchinson will be succeeded by **J. H. Fraser**, assistant general manager in charge of the second district with headquarters at Springfield, who in turn will be succeeded by **M. M. Sisson**, assistant general manager of the first district with the same headquarters.

Traffic

H. J. Carr has been appointed general agent for the Green Bay & Western, with headquarters at New York.

George H. Clark, whose appointment as assistant general freight agent of the New York Central with headquarters at New York, was announced in the *Railway Age* of December 8, page, 1088, was born on February 7, 1878, at Brooklyn, N. Y., and was educated in the public and high schools. He entered railway service on January 1, 1900, with the Merchants Despatch (New York Central fast freight lines) with headquarters at New York. On June 8, 1904, he was appointed contracting freight agent and on March 15, 1905, was appointed chief clerk to the general eastern freight agent, serving in that capacity until November 1, 1911, when he was appointed division freight agent with headquarters at Utica, N. Y. A year later he was appointed general freight and passenger agent of the Ottawa & New York (now the New York Central) with headquarters at Ottawa, Ont. In April, 1916, when the Ottawa & New York was taken over by the New York Central, Mr. Clark was appointed division freight and passenger agent at Ottawa. On January 16, 1922, he was appointed division freight agent with headquarters at New York, which position he was holding at the time of his recent promotion to assistant general freight agent.

G. H. Clark

W. R. Cox, division freight agent on the Pennsylvania, with headquarters at Columbus, Ohio, has been transferred to Youngstown, Ohio, succeeding **W. M. Wallace,** who has retired. **J. E. Collins,** division freight agent, with headquarters at Richmond, Ind., has been transferred to Columbus, succeeding Mr. Cox.

A. V. Kipp, whose appointment as assistant general freight agent of the Union Pacific with headquarters at Salt Lake City, Utah, was announced in the *Railway Age* of December 15, page 1140, was born on April 12, 1879, at Kewaunee, Wis. He entered railway service in June, 1901, with the Chicago, Rock Island & Pacific. In September, 1902, he entered the employ of the Union Pacific as a telegraph operator in the chief dispatcher's office at Omaha, Nebr., and was later transferred to the telegraph office. In April, 1910, he was promoted to traffic agent with headquarters at Rawlins, Wyo., and in June of the same year to traveling freight agent with headquarters at Denver, Colo., which position he held until June, 1915, when he was promoted to contracting freight agent with the same headquarters. During the war he was in the service of the government as district representative of the traffic department of the U. S. Food Administration in Denver and in January, 1919, returned to the Union Pacific as traffic agent with headquarters at Denver, Colo. In March, 1920, he was promoted to general agent with headquarters at Butte, Mont., which position he held until August of the same year when he became general freight and passenger agent of the Salt Lake & Utah at Salt Lake City, Utah. He was promoted to traffic manager in March, 1921, which position he has held until his recent appointment.

A. V. Kipp

Engineering, Maintenance of Way and Signaling

Joseph B. Strauss, president of the Strauss Bascule Bridge Company of Chicago, has been appointed consulting engineer of the Alaska Railroad.

Frank Strong, division engineer of the Salt Lake division of the Union Pacific, with headquarters at Salt Lake City, Utah, has been promoted to terminal engineer at Los Angeles, Cal., a newly created position.

V. C. Halpin, assistant engineer of the Missouri Pacific with headquarters at Little Rock, Ark., has been promoted to division engineer of the Louisville division with headquarters at Monroe, La., succeeding W. P. Hayes, promoted. **C. A. Hewes,** assistant engineer of the Kansas Terminal division, has been transferred to Little Rock, succeeding Mr. Halpin.

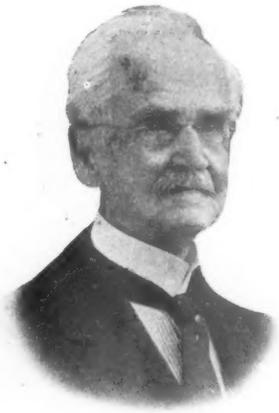
Obituary

H. H. Johntz, engineer maintenance of way of the Missouri-Kansas-Texas with headquarters at Dallas, Texas, died in that city on December 20 from acute indigestion.

M. A. Patterson, general freight agent of the Chicago, Rock Island & Pacific, whose death on December 17 was reported in the *Railway Age* of December 22, entered railway service in January, 1879, as a clerk in the local freight office of the Illinois Midland at Peoria, Ill. He was later appointed clerk and chief clerk in the local freight office of the Chicago, Rock Island & Pacific at Peoria. In November, 1884, Mr. Martin was appointed chief clerk to the general freight and passenger agent of the Rock Island & Peoria at Rock Island, Ill. In June, 1898, he was promoted to general freight and passenger agent and continued in this capacity until July 1, 1902, when the Rock Island & Peoria was consolidated with the Chicago, Rock Island & Pacific, at which time, he was appointed assistant general freight agent, with headquarters at Rock Island. In July, 1903, Mr. Patterson was transferred to Kansas City, Mo., and in November, 1904, was again transferred to Chicago. He was promoted to general freight agent in September, 1917, and continued in this position until his death.

James E. Hood, general manager of the Uintah Railway with headquarters at Mack, Colorado, died on December 13. Mr. Hood was born at Cambridge Springs, Pa., and celebrated his fifty-sixth birthday two days before his death. He was graduated from Allegheny College and entered the service of the Erie in the engineering department and was later appointed roadmaster. Soon after he was promoted to trainmaster and division engineer. He entered the service of the Great Northern and helped in the construction of its line into Spokane and Seattle from Havre, Montana. In 1902, he was appointed superintendent of the Spokane division at Spokane, Wash., and retained this position about eight years. In 1910 he was appointed superintendent of the Chicago, Milwaukee & St. Paul at Three Forks, Mont., and was successively division superintendent of three divisions of that road. He entered the army during the war as a lieutenant with the contingent under Colonel George H. Emerson, and went to Siberia, where he was promoted through the various ranks to that of major. While in Siberia he was associated with John F. Stevens in the operation of the Siberian railways. Upon returning to America, he was appointed general manager of the Uintah Railway in April, 1921.

J. H. Setchel, formerly secretary and president of the American Railway Master Mechanic's Association and later sales manager of Jerome & Elliott, manufacturers of metallic packing, died on December 13 at Cuba, N. Y. He was born on December 25, 1835, at South Bainbridge, Chenango county, New York, and in early life entered railroad service with the Galena & Chicago Union Railroad in its roundhouse. Soon after, he served a two-year apprenticeship as machinist with the Detroit Novelty Works at Detroit, Mich., and for several years following was a machinist and locomotive engineer on the Ohio and Mississippi rivers. Subsequently until the breaking out of the Civil War, he was a locomotive engineer on the Louisville & Nashville. During the first year of the war he was a foreman at Nashville, Tenn., and from 1862 to 1868 he was a locomotive engineer on the Little Miami Railroad. During the latter year he was promoted to assistant master mechanic in charge of the shops at Columbus, Ohio, which position he held until 1873, when he became superintendent of the Kentucky Central. From 1874 to 1885 he was general master mechanic of the Ohio & Mississippi and in the latter year he resigned to become superintendent of the Brooks Locomotive Works, which position he held for three and one-half years, when he entered the employ of the Pittsburgh Locomotive Works as general traveling agent. In November, 1902, he was appointed western representative and traveling agent for the American Locomotive Company with headquarters at Chicago, which position he held until October 1, 1903, when he became general sales manager for Jerome & Elliott. He was elected secretary of the American Railway Master Mechanic's Association at its fourth annual meeting, which position he held for 18 years when he was elected president for two years.



J. H. Setchel

Open-Minded

PROGRESSIVE railroad men are those who "think in terms of changing events."

They are open-minded. They welcome every opportunity to better present methods and existing equipment.

They are the pioneers in longer, continuous runs, in the "peg system", in "main-tracking" through freights, in "turn around" plans and in quick turning of locomotives.

To these men has come the realization of the possibilities lying in better locomotives.

They are putting the vitalizing factors to work; earning greater returns from every dollar of locomotive investment.

G. M. BASFORD COMPANY
17 East 42nd Street
New York City.

Engines are too Big to Control by Hand

SHIP Captains long ago quit relying on turning the helm by hand.

Men enough to handle a big steamer in a storm couldn't get their hands on the wheel.

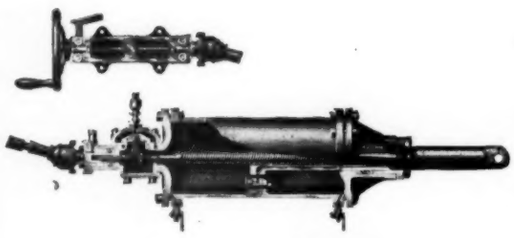
Therefore the steam steering gear on ships.

It's just the same with the locomotive reverse gear.

Theretore the Precision Power Reverse on locomotives.

It puts the cut-off exactly where it's wanted, within a fraction of a notch.

No man can control cut-off on a big engine by hand and make a job of it.



Absence of cross-head and guides lightens the gear and reduces its maintenance.

Franklin Railway Supply Company, Inc.
17 East 42nd Street, New York
332 So. Michigan Avenue, Chicago, Ill. 1209-12 Praetorian Bldg., Dallas, Texas 774 Monadnock Bldg., San Francisco, Cal.
Franklin Railway Supply Company of Canada, Limited, Montreal
Export Department—International Railway Supply Co.—30 Church St., New York

Franklin Precision Reverse Gear

LIMA LOCOMOTIVES

TON MILE COSTS

LOW ton mile costs are impossible unless the motive power is right.

During the last few years, great progress has been made in locomotive design and equipment.

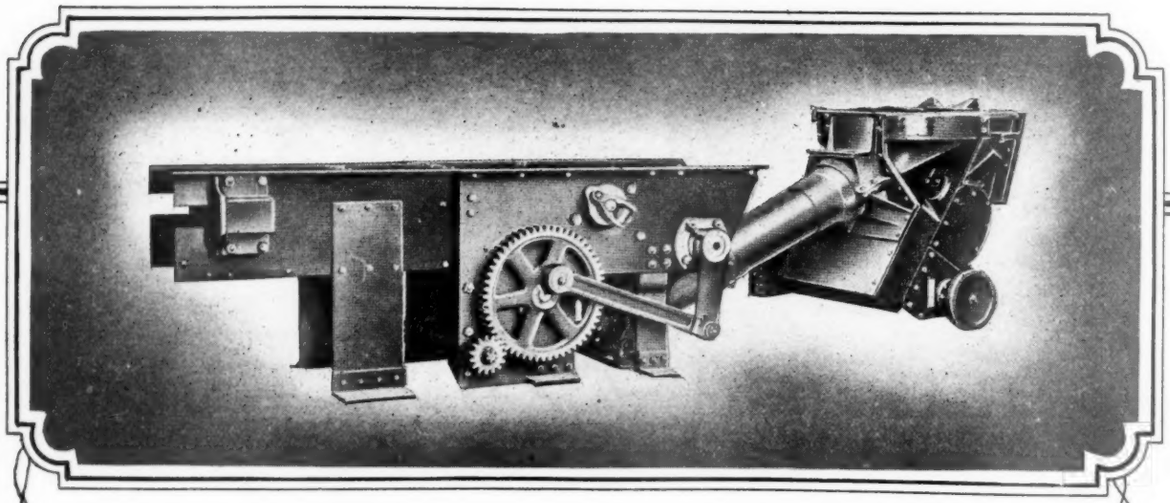
Unless locomotives are most carefully planned for the work they are to do and unless they are equipped for maximum ton miles per dollar of cost, highest ultimate net returns are impossible.

The designs and equipment of the next lot of locomotives will materially affect the future operating record of the railroad.

Lima has valuable information on locomotives designed to reduce ton mile costs.

Discussion of this subject is invited.

LIMA LOCOMOTIVE WORKS
INCORPORATED
Seventeen East Forty-second Street, New York
LIMA, OHIO



ELVIN STOKERS

"ALCO BUILT"

THE recent period of heavy traffic and demand on locomotives provided an unusual opportunity for study of the performance of locomotive stokers.

Under such conditions Elvin Stokers have consistently demonstrated their qualities of endurance and economy.

These demonstrable advantages result from correctness of the basic principles involved in the design, the ruggedness of construction and simplicity of operation.

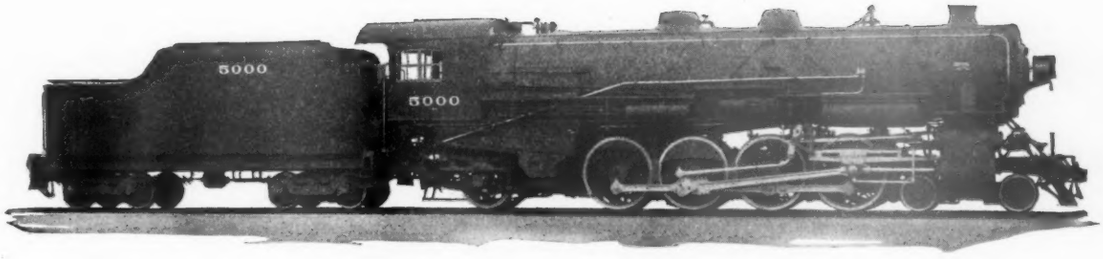
The economy in use of coal is something you cannot afford to overlook. It can be proved to your satisfaction on your road when you are ready to investigate.

For detailed description see LOCOMOTIVE CYCLOPEDIA 1922 Edition

The Elvin Mechanical Stoker Company

50 Church Street New York City

Showing the Way



Three Cylinder Mountain Type Locomotive In Freight Service on the Lehigh Valley Railroad

Three Cylinder—25 x 28 inches

Weight of Engine—369,000 pounds

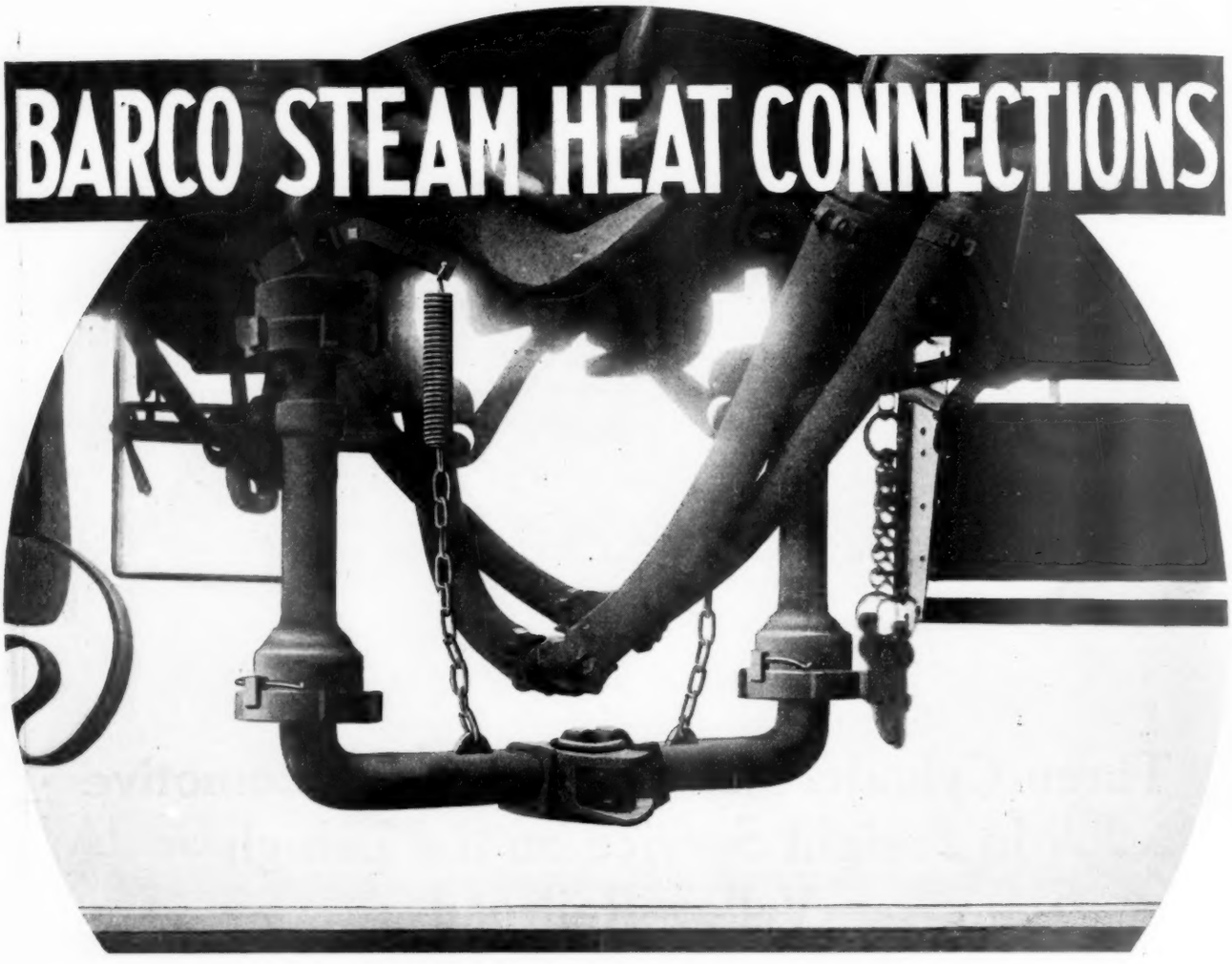
Diameter of Driving Wheels—69 inches

Boiler Pressure—200 pounds

Tractive Power—64,700 pounds

AMERICAN LOCOMOTIVE COMPANY

30 Church Street **New York City**



Where Service Is Always Severe

TO decide what type of equipment is best adapted for the exacting service demanded from car steam heat connections—inevitably leads to the selection of Barco Flexible All Metal Connections.

No other equipment is so fully prepared to withstand the gruelling conditions that the exposed location of these parts imposes. Nor can you find any other connections so carefully designed and constructed to withstand high steam pressures and temperatures—yet retaining the necessary flexibility to adjust themselves to all differences of alignment between cars, and able to take even the sharpest curves and sidings without any restriction whatsoever of steam passages.

Barco Connections will not freeze, burst nor fail. They entirely eliminate the expense and annoyance of frequent renewals and assure well heated trains under all conditions.

It is not too late to apply Barco Connections to your cars in time to receive the benefit during the present Winter. Wire in your orders for immediate shipment. These Connections are interchangeable with hose, and can be applied in a few minutes.

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition

Barco Manufacturing Company

1801 Winnemac Ave., Chicago, Ill.

IN CANADA
MONTREAL-TORONTO

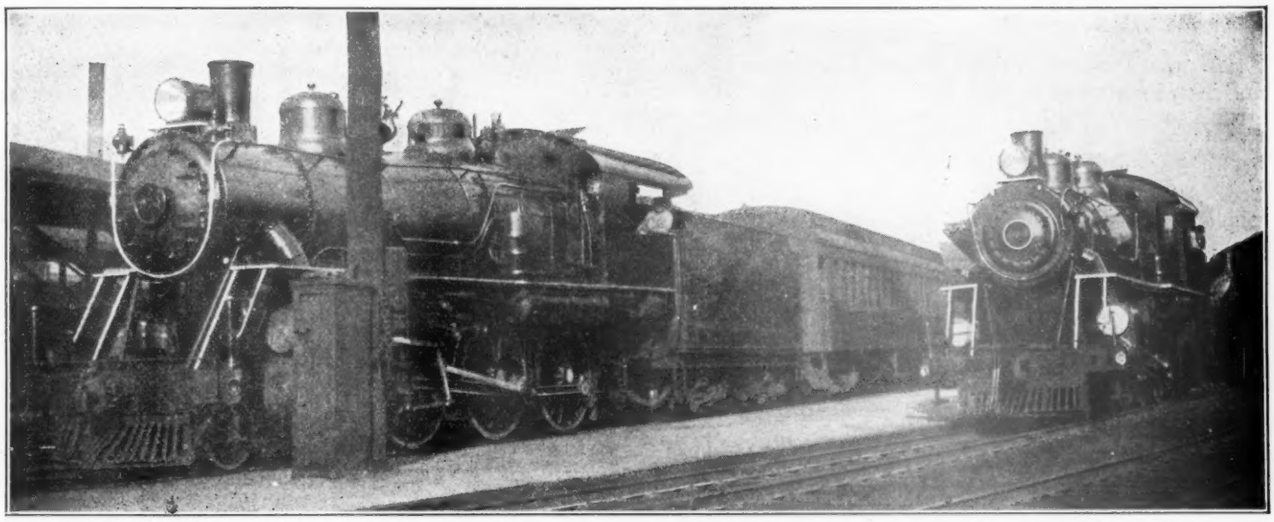
THE HOLDEN CO., LTD.

IN CANADA
WINNIPEG-VANCOUVER

BALDWIN

On the Erie Railroad

Baldwin locomotives make records for punctuality



Two "Red Spot" locomotives—the "Harvey Springstead" and the "Calvin Voorhis"—ready to pull out of the Jersey City Terminal. One engineman on each Division of the Erie System who has the longest record of competent service is allowed to have his name painted on the cab of his locomotive.

THE Erie Railroad handles a heavier suburban traffic than any other road entering New York. Approximately 100,000 persons are handled in and out of the Jersey City Terminal daily, and the number of train movements in both directions totals 318 per day.

This traffic is moved with remarkable punctuality. During the months of June to September, 1923, inclusive, 98.1 per cent of the trains were on time —a most exceptional record.

Of the 115 locomotives which handle this traffic, the majority are Baldwins of the Ten-wheeled and Atlantic Types. The reliability of the service proves the quality of the motive power.

The two Ten-wheelers shown above were built by these Works in 1903 and subsequently equipped by the Railroad Company with superheaters, piston-valve cylinders and outside valve gear.

THE BALDWIN LOCOMOTIVE WORKS

PHILADELPHIA

1169

LOCOMOTIVES

ACHIEVEMENTS OF 1923

1480 new Duplex Stokers placed in service during year, making grand total of 6,692 of our Stokers in service up to the present time. (The figures for 1923 set a new record for Stokers built, sold and placed in service in a single year.)

Number of Railroads on which our Stokers are in service increased to 80.

Largest single Stoker order in railroad history received and filled —475 Duplex Stokers in one lot for one Railroad.

Operation of a Duplex Stoker-fired passenger locomotive 993 continuous miles, with train in regular service, to demonstrate time-saving advantages of long hauls when fire-cleaning delays are eliminated.

10,000 square feet of factory floor space added to meet heavy production requirements of the year, and to provide greater facilities for the increased business of the future.

—"because the Promise has been Performed"

LOCOMOTIVE STOKER CO.

Main Office and Works—30 General Robinson St., West, Northside, PITTSBURGH, PA.

Hudson Terminal Bldg.
50 Church St.
NEW YORK

Munsey Bldg.
1329 "E" St., N. W.
WASHINGTON

Railway Exchange Bldg.
80 E. Jackson Blvd.
CHICAGO

1924

WITH the beginning of the New Year, we wish to express the appreciation we feel toward the railroads for the deep measure of confidence which has been reposed in our policies and products in the past, and to assure customers and friends that the same broad, progressive practices which have marked the development of our business since 1869 will continue to shape our relations with those whom we are privileged to serve in 1924.

A. L. Humphrey

PRESIDENT, WESTINGHOUSE AIR BRAKE CO.

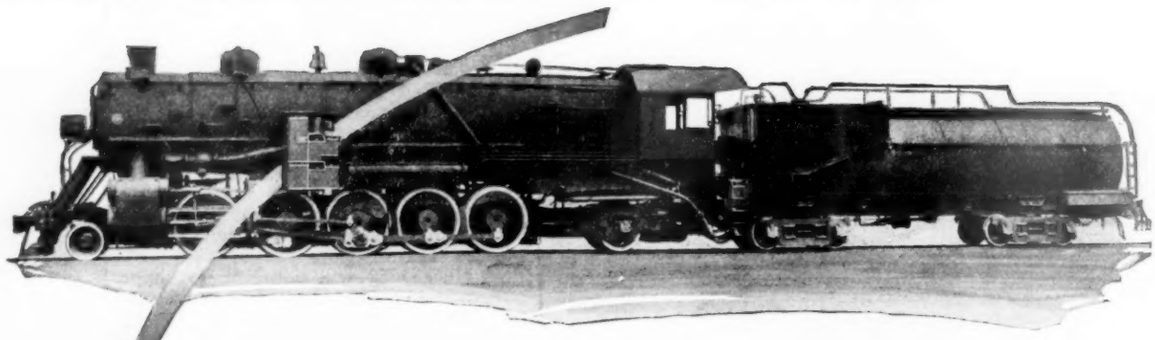
"Home of The Air Brake"

WESTINGHOUSE AIR BRAKE CO.

General Offices and Works, Wilmerding, Pa.

New York Washington Chicago St. Louis San Francisco

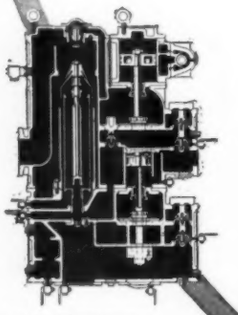
Worthington Locomotive Feed Water Heater



1,355,022,222 B. T. U's

Saving per engine per month

Think of it! over a billion B. T. U's saved per engine per month. This is the figure resulting from data gathered on the performance of 30 locomotives, equipped with the Worthington heater. The records cover the 30 engines and their operation over one division for three months. The total fuel saved was 103 carloads or over three thousand tons.



Sectional view of the Worthington heater showing hot and cold water pump pistons at the right and heating chamber at the left.

WORTHINGTON PUMP AND MACHINERY CORPORATION

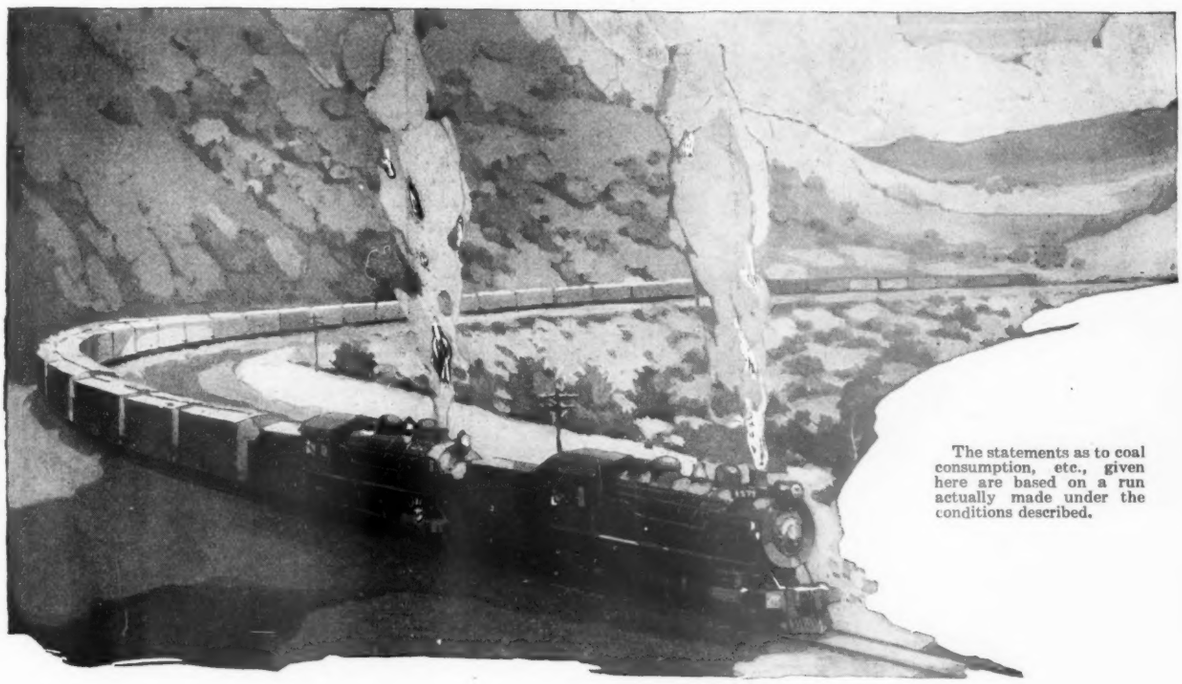
Executive Offices: 115 Broadway, New York City. Branch Offices in 24 Large Cities

W-281.8

WORTHINGTON

Deane Works, *Holyoke, Mass.*
Blake & Knowles Works *East Cambridge, Mass.*
Worthington Works *Harrison, N. J.*
Laidlaw Works, *Cincinnati, Ohio.*
Hazleton Works, *Hazleton, Pa.*
Gas Engine Works, *Cudahy, Wis.*
Power & Mining Works *Cudahy, Wis.*
Snow-Holly Works *Buffalo, N. Y.*
Epping-Carpenter, *Pittsburgh, Pa.*

Worthington Locomotive Feed Water Heater



The statements as to coal consumption, etc., given here are based on a run actually made under the conditions described.

A Double Header Comparison

One night a double-header left X for Y and it just happened that this gave an excellent opportunity to judge the results of a Worthington heater. The first engine was injector fed, while the second was equipped with a Worthington heater.

The drag on this run was heavy and the tonnage full, so steam was worked all the way. At Z when part of the run was over, the injector engine took seven tons of coal. The heater equipped engine required only five tons—two tons less to fill the tender.

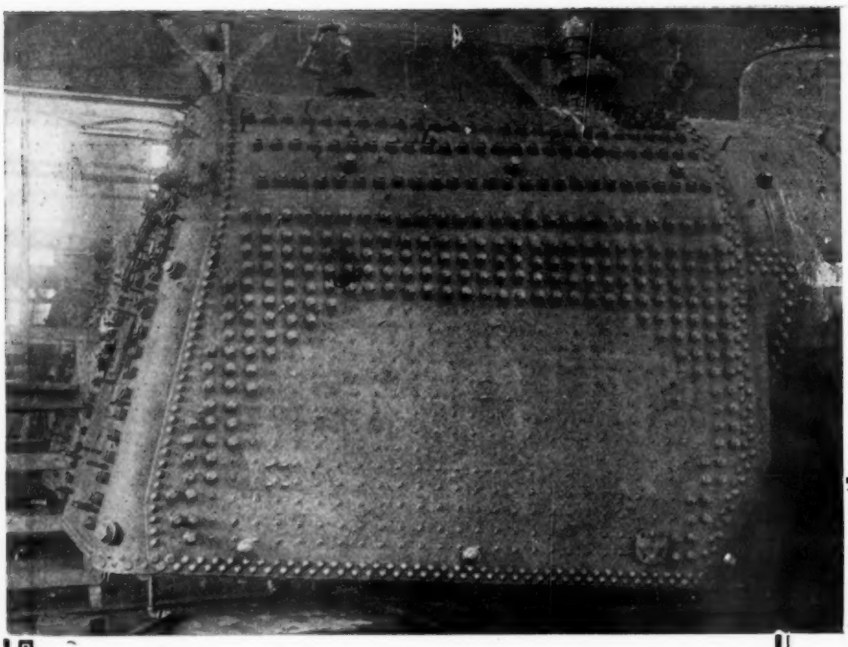
Giving the head engine (injector fed) credit for more shifting and taking up slack, the saving of the second locomotive with the Worthington heater was between one and two tons of coal.

WORTHINGTON PUMP AND MACHINERY CORPORATION

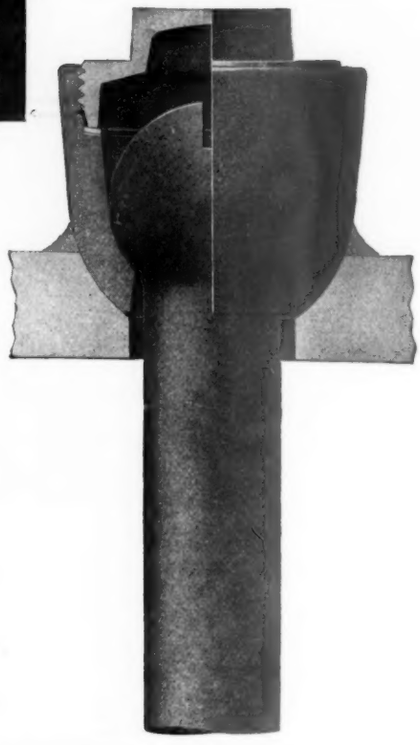
Executive Offices:—115 Broadway, New York City. Branch Offices in 24 Large Cities

Blake & Knowles Works, East Cambridge, Mass. W-282.8

WORTHINGTON



Illustrating the installation of F. B. C. Universal Welded Flexible Staybolts on ten locomotives of a Western Railroad.



The modern locomotive must be kept in service in order to produce earnings for the road—are you sure that your power is giving the greatest possible returns? How often is it necessary to shop the engines for minor repairs, such as a broken staybolt here and there?

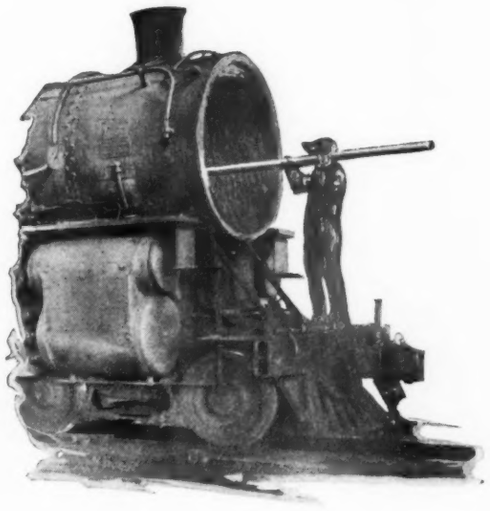
Why not equip your engines with staybolts which will assure you of continuous service at a lower cost of upkeep, reduce your expenses for overhauling power and receive the normal mileage from every unit.

The F. B. C. Universal Welded Flexible Staybolt is a definite contributing factor in bringing about increased service from power under all conditions.

Flannery Bolt Co.

3528 Forbes St. Pittsburgh, Pa.

What Becomes Of Your Boiler Tubes?



Back to the Boiler or to the Scrap Pile?

BADLY pitted and corroded tubes were causing one large trunk line considerable trouble.

Comparative tests were made to find a boiler tube which would fight the pitting action of tube-corroding feed water. The road's worst water section was chosen for the test.

Eighteen months later, the tubes of less-resistant material were removed. After the removal of scale, all the tubes, badly pitted, were scrapped.

At the same time, the Parkesburg Tubes, of real charcoal iron, were removed and inspected. Only a slight surface pitting was visible. Every Parkesburg Tube was safe-ended and returned for further service.

What becomes of your boiler tubes when they are removed from the engine at the shopping period? Are they unfit for further service?

Or—are they real, corrosion-fighting Parkesburg Tubes, that go back in the boiler for many more months of service?

How Parkesburg Charcoal Iron Boiler Tubes are made, why they last longer than tubes of other material, and a number of actual instances of long and economical tube service are interestingly told in "Parkesburg Tubes". Send for a copy.

The Parkesburg Iron Company

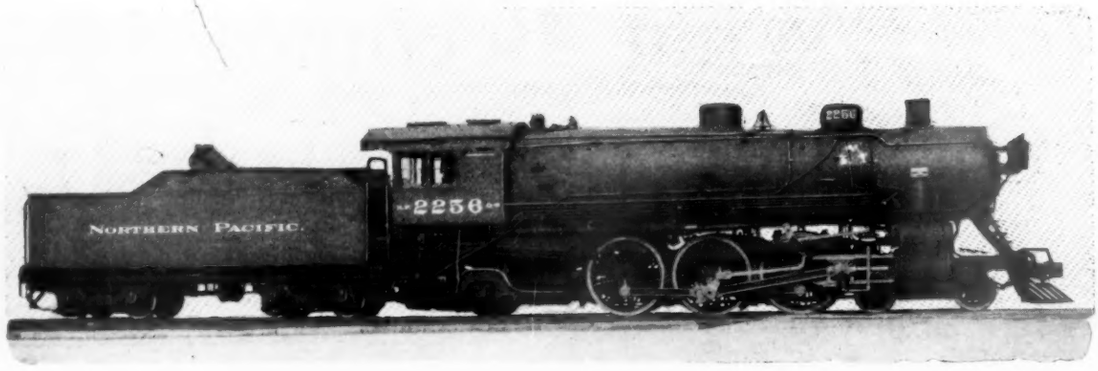
Parkesburg, Pa.

BRANCH OFFICES

New York, 30 Church Street — Boston, Oliver Building — Chicago, Fisher Building
Philadelphia, Commercial Trust Building — St. Louis, Security Building
San Francisco, Rialto Building — Montreal, New Birks Building
St. Paul, 906 Merchants Bank Building

EXPORT AGENTS

Wonham, Bates & Goode Trading Corporation, New York



Carbon-Vanadium on the Northern Pacific

ON twenty up-to-the-minute Pacifics, built this year for the Northern Pacific Railway Company by the American Locomotive Company, pins, rods, driving and trailer truck axles are made of Carbon-Vanadium, the unquenched alloy steel.

Carbon-Vanadium was also selected for the same forgings on 25 Mikados and 4 Mallets built by American for the Northern Pacific.

Carbon-Vanadium was chosen because it is stronger and tougher than plain carbon steel, has a greater resistance to fatigue and is readily forged and handled in a railroad shop. The same qualities make Carbon-Vanadium an ideal replacement steel for forgings that fail in service.

Write for complete information about Carbon-Vanadium, its advantages, and the names of steel makers and forging companies from whom it can be obtained.

Write for Bulletin LF-1 and other data on Carbon-Vanadium, the Normalized Forging Steel.

VANADIUM CORPORATION OF AMERICA

NEW YORK *120 Broadway*

DETROIT *Book Bldg.*

VANADIUM STEELS

for Strength, Toughness and Durability

450,000 Square Feet of Floor Space Devoted to Repairing Locomotives

ONE OF THE ERECTING ROOMS IN LOCOMOTIVE SHOP 95′ 0″ x 900′ 0″
Showing a part of the 74 locomotives stripped in this building and in process of repair

Morgan Locomotive Repair Service

We have one of the finest equipped shops in the country for repairing and rebuilding locomotives of all types and sizes.

We have been successfully repairing locomotives for the past two years.

Twelve of the leading roads have already taken advantage of our service.

We are completing nine locomotives per week and can maintain this production.

Our system of charges is such that repair prices can be determined before work is started. Your request for particulars carries no obligation.

The Morgan Engineering Co.

Alliance, Ohio

Designers, Manufacturers and Contractors
Electric Traveling Cranes, Rolling Mill Machinery
Ordnance Steel, Shipbuilding and Forging Plants Complete
Rock Crushers, Special Machinery for Any Purpose

Chicago
132 So. Michigan Ave.

New York
120 Broadway

Pittsburgh
1420 Oliver Bldg.

Greetings

We take from the loom of years another finished roll, into which has been woven all the experiences of the past with the practicability of today. Gazing with satisfaction upon the completed texture we are gratified to find our threads woven together with the cordial relations of railway executives.

With this ceaseless loom of time, we must ever move, on and on, and it is our earnest desire that these pleasant associations may continue during the years to come.

Taking this occasion, we extend to our many friends of the railway world, the season's greetings and best wishes for a prosperous New Year.

Hunt-Spiller Mfg. Corporation

W. B. Leach, Pres. & Gen. Mgr. J. G. Platt, Vice-Pres. & Sales Mgr.

Office and Works

383 Dorchester Ave., South Boston, 27, Mass.

"Our Syphon Engines Haul 10% More Tons"

"We have one engine of a group equipped with Nicholson Thermic Syphons. The Syphon engine is regularly hauling 10% more tonnage than other engines of the same class not so equipped."

—Supt. of Motive Power.

Here is true operating economy!

Securing a higher tonnage hauled, by increasing fuel effectiveness.

Nicholson Thermic Syphons not only provide larger area of heating surface but stimulate boiler circulation so that steam production is speeded. The result is a 10 to 20% increased steaming capacity for the same fuel.

This gives to under-boilered locomotives the power to haul more tons.

Arrange a Syphon program now!

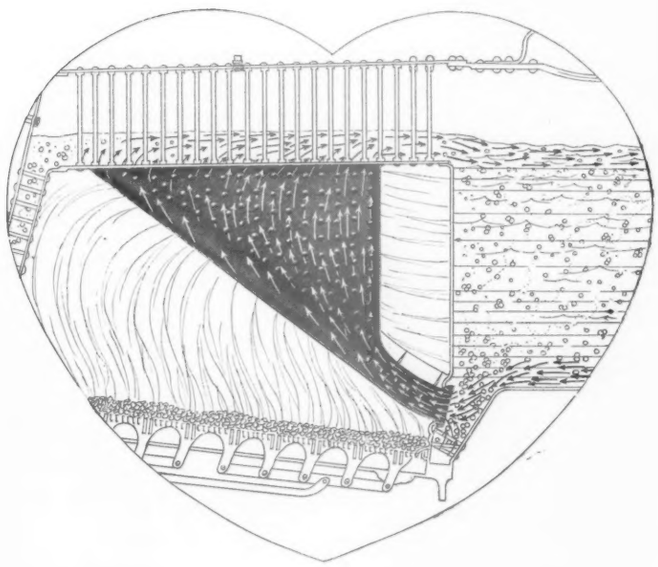
Bulletin No. 5 explains how Nicholson Thermic Syphons increase capacity without adding to the maintenance burden.

LOCOMOTIVE FIREBOX COMPANY

140 *South Dearborn St., Chicago, Illinois*

THE HOLDEN COMPANY, LIMITED

Montreal *Toronto* *Winnipeg* *Vancouver*



NICHOLSON THERMIC SYPHONS

—the Heart of the Locomotive

"Railway" Service

"Railway" Engineering service is proving invaluable to mechanical men who are called upon to meet special problems of equipment.

It enables them to quickly and definitely decide on requirements and to buy with assured economy and service.

We neither ask nor expect you to accept this statement without a personal test.

Railway Steel Spring Co.

Makers of

Locomotive and car wheel tires.
Steel tired wheels.
Steel springs, any size or shape.
Pressed steel journal box lids.

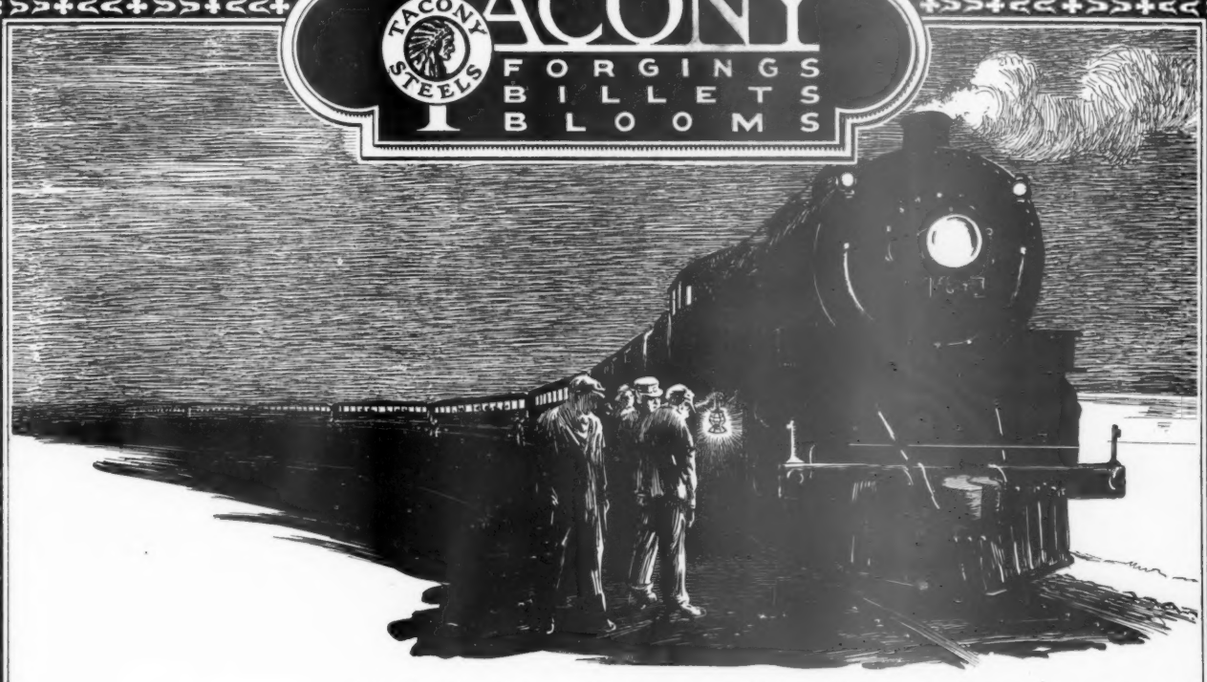
30 CHURCH STREET NEW YORK CITY

For detailed description see CAR AND LOCOMOTIVE CYCLOPEDIAS 1922 Edition

TACONY STEELS

TACONY

FORGINGS
BILLETS
BLOOMS



When a side rod lets go, it's too late to wish it had been made of better steel. But don't make the error of replacing the broken rod with another of carbon steel.

What Are You Doing To *Prevent* Rod Failures?

NOT all rod failures are due to defects that can be detected by inspection. Perhaps the most frequent cause of failure is lack of resistance to fatigue—the eventual surrender of a carbon steel forging to the severe stresses to which it is subjected.

Guard against forging failures by adopting an alloy forging steel of the required strength, toughness and resistance to fatigue.

Such a steel is Tacony Carbon-Vanadium. Its elastic limit is 50% higher than that of plain carbon steel. Its tensile strength is greater. Its Vanadium content gives it a resistance to fatigue that cannot be obtained in carbon steel.

Replace those inadequate carbon steel forgings with parts of Tacony Carbon-Vanadium and you are safeguarded against costly forging failures.

Send for a copy of our latest Bulletin "Locomotive Forgings and Forging Billets of Tacony Carbon-Vanadium Steel".

Let us quote you on forgings, billets, blooms or slabs of Tacony Carbon-Vanadium Steel.

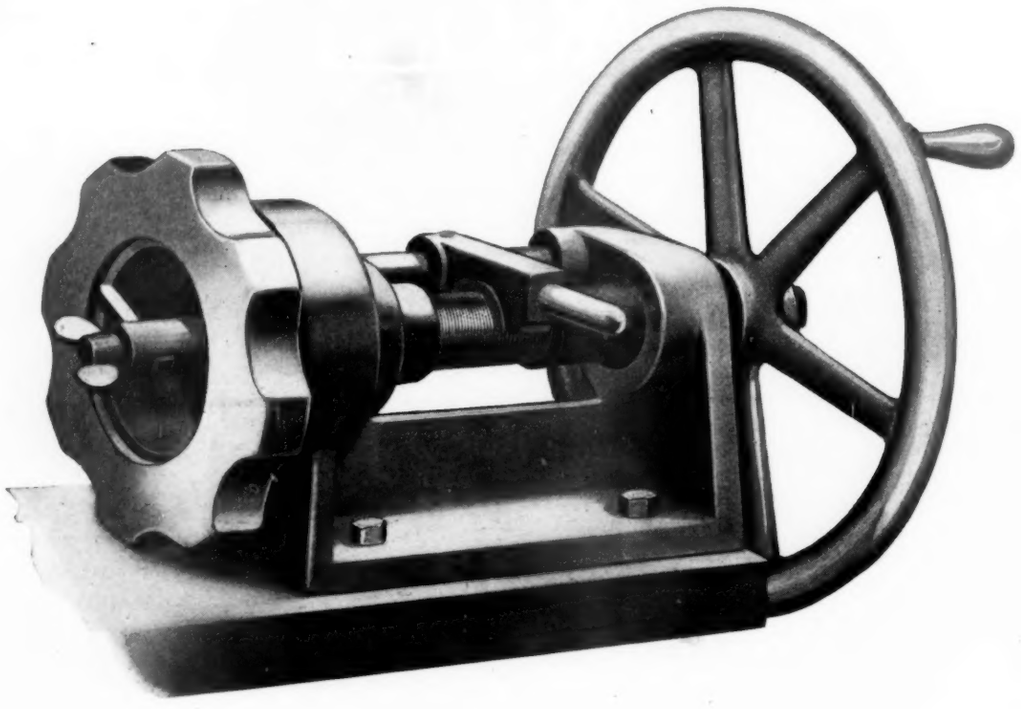
TACONY STEEL COMPANY

Franklin Bank Building

PHILADELPHIA, PA.

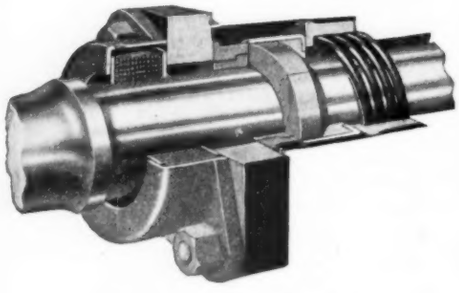
DISTRICT SALES OFFICES:

New York: No. 2 *Rector Street.*
Boston: 141 *Milk Street.*
Detroit: 620 *E. Hancock Ave.*
San Francisco: 160 *Beale Street.*



A Saving of Minutes Is a Saving of Dollars

WHERE do your men bore their King Metallic Packing Rings?



Easy to apply, steam-tight and long wearing, King is a money-saving packing for your locomotives.

Do they have to carry rings from roundhouse to back shop—and wait around idly until a lathe hand can change his machine?

Or, are your roundhouses equipped with the time-saving King Hand Boring Lathe, an easily operated, handy tool that can be set up where the packing rings are used.

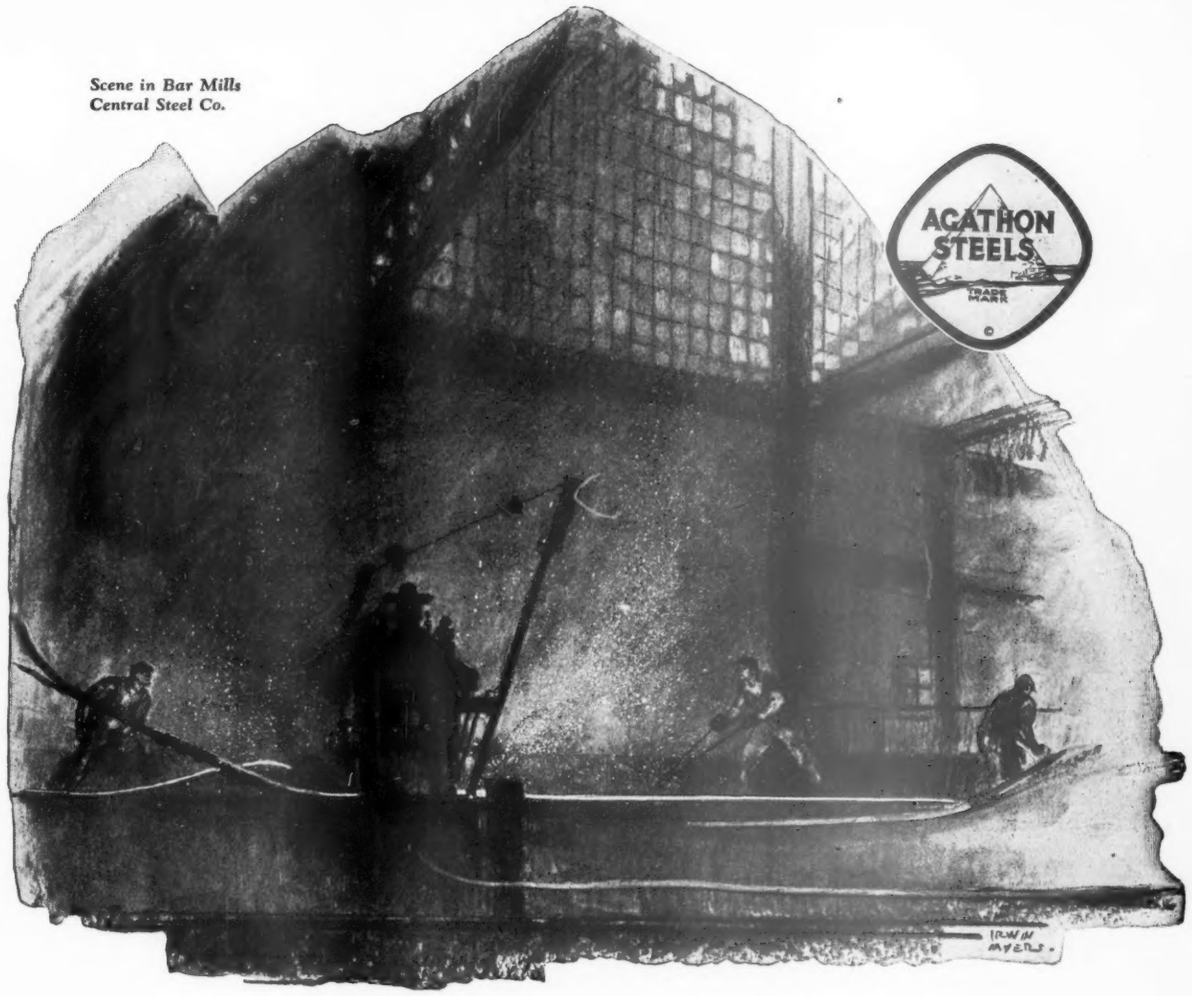
King Hand Boring Lathe requires no power for its operation. Packing rings can be chucked up and removed without the use of wrenches or other tools.

Write for particulars, or tear out this page and pass it along to the man who is responsible for roundhouse labor costs.

The U. S. Metallic Packing Co.

429 North 13th Street, Philadelphia, Pa.
30 Church St., New York 1008 Rand McNally Bldg., Chicago
1948-49 Railway Exchange, St. Louis, Mo.

King Hand-Boring Lathe



Scene in Bar Mills
Central Steel Co.

We Can Solve Your Problem—If It's IN the Steel

We have a daily production in all kinds of Agathon Alloy Steels such as—

Nickel, Chrome-Nickel, Uma, Molybdenum, Chrome-Molybdenum, Nickel - Molybdenum, Vanadium, Chrome-Vanadium, Chromium, etc.

Deliveries in Blooms, Billets, Slabs, Bars, Hot Rolled Strips, etc.

Perhaps you require a steel of greater hardness, strength, density or adaptability to heat treatment than you are now using for locomotive parts such as piston rods, main and side rods, axles, crank pins, etc.

Our expert metallurgists and practical steel men, working in one of the best equipped chemical and physical laboratories in America, will gladly solve your problem in steel—without charge. Write us. Ask for interesting booklet.

The Central Steel Company, Massillon, Ohio

AGATHON ALLOY STEELS
FOR LOCOMOTIVE PARTS

The DUPONT-SIMPLEX STOKER introduces the coal where the draft is lowest.

TO BURN THE SPARKS

LOW distribution of the coal in the firebox by the DUPONT-SIMPLEX STOKER literally chops off a large outgo of dollars.

At the end of the Arch, the speed of the gases often is as high as 180 miles per hour.

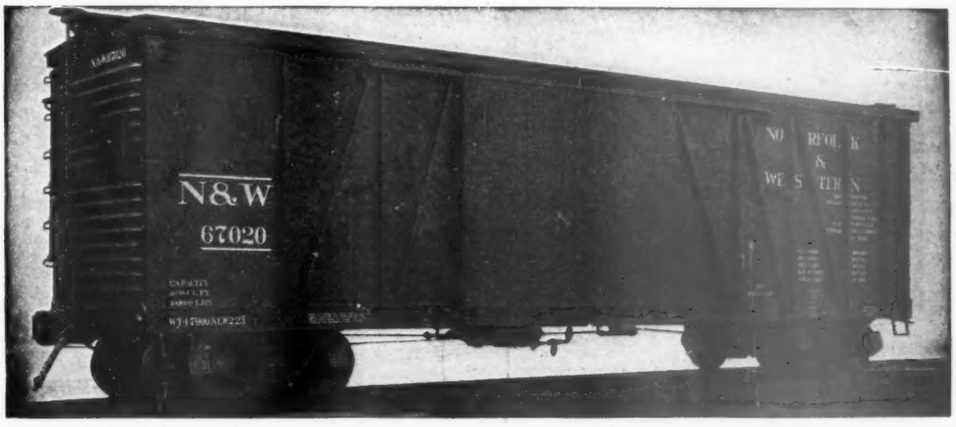
The finer particles of coal, if thrown into that zone, haven't a chance to burn.

DUPONT-SIMPLEX STOKERS introduce the coal low down in the firebox where the draft is lowest and distribute it by downwardly acting steam jets that more than checkmate the light draft immediately above the fire-bed.

STANDARD STOKER COMPANY, INC.

Grand Central Terminal, New York, N. Y.
McCormick Bldg., Chicago, Ill. duPont Bldg., Wilmington, Del.
Foundries and Works, Erie, Pennsylvania

DUPONT-SIMPLEX STOKER



Builders of Steel and Composite Freight Cars. Manufacturers of Pressed Steel Repair Parts and Forgings. Specialists in Repairing and Rebuilding Railroad Freight Cars.

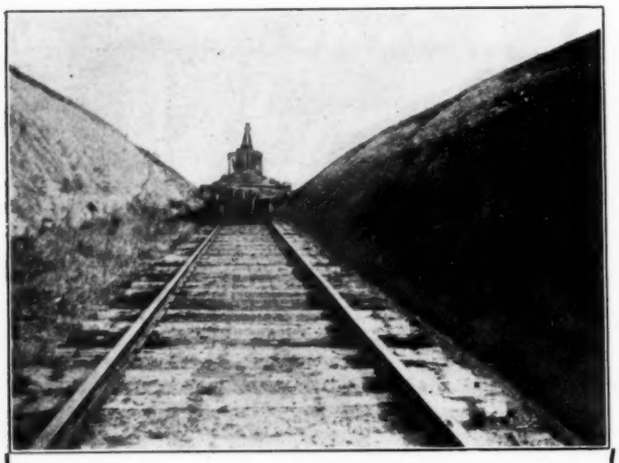
The Ralston Steel Car Company

COLUMBUS, OHIO

We extend to all our friends, cordial good wishes for a Happy and Prosperous New Year

Commonwealth Steel Company

St. Louis



Here's still another reason why maintenance of way men prefer the "AMERICAN:"

The "AMERICAN" is the only ditching machine with a pull-back line, without which there is no possibility of getting the dipper back far enough and accurately enough to keep an even berm line. Operators of other machines just drop the shovel and hope for the best.

AMERICAN
HOIST & DERRICK CO.
Saint Paul, Minn.
New York - Chicago - Pittsburgh - Seattle - New Orleans

GREAT SOUTHERN'S HISTORY-MAKING REFORESTATION OPERATIONS ASSURE OUR TRADE A SUPPLY IN PERPETUITY

BOGALUSA

IN HIGH-CLASS RAILWAY USE

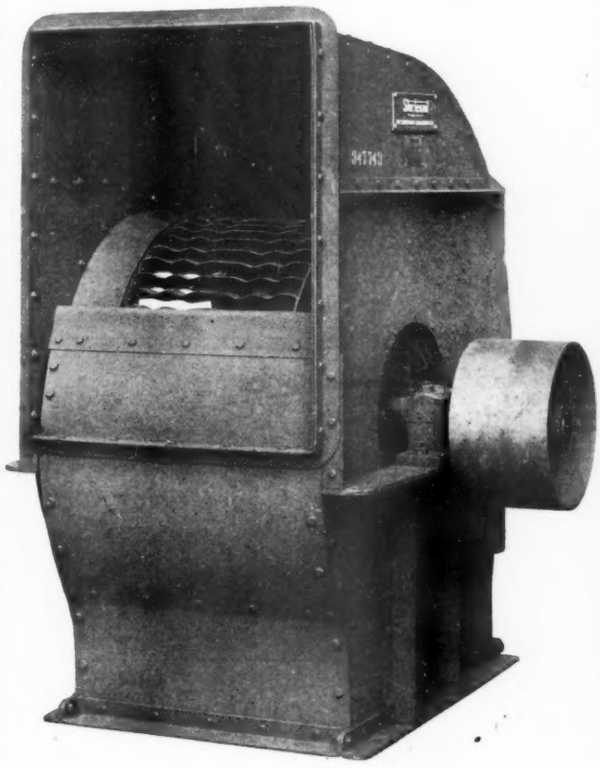
especially, the *Extra-dense* quality of Great Southern's unequalled virgin stands of *BOGALUSA Long-leaf Pine* is highly important. A remarkable proportion of our 25 more years of original timber meets the rigid exactions of the A.R.E.A., A.S.T.M. and the Factory Mutuals. "BOGALUSA" is standard for all Railway usage. It is best to specify by name, "BOGALUSA," branded on every timber.

CAPACITY 1,000,000 FEET DAILY—
WITHOUT HASTE OR STRAIN

Immediate and accurate response to all inquiries.

Great Southern Lumber Co.
Bogalusa, Louisiana

"THE MOST SUBSTANTIAL AND IMPRESSIVE INDUSTRIAL DEVELOPMENT IN THE SOUTH TODAY"



A Big Job—Unusual?

No!

Two engine houses are nearing completion at the Selkerk Yards of the New York Central. These buildings combined, will house sixty-two locomotives.

Sturtevant apparatus will furnish heat and ventilation. Three hundred and fifty thousand cubic feet of air a minute will be delivered at the correct temperature through two Sturtevant fans.

Railroad buildings of all types, large or small, can be furnished with Sturtevant equipment for heating and ventilating.

Why not have us make recommendations?

B. F. STURTEVANT COMPANY
HYDE PARK, BOSTON, MASS.

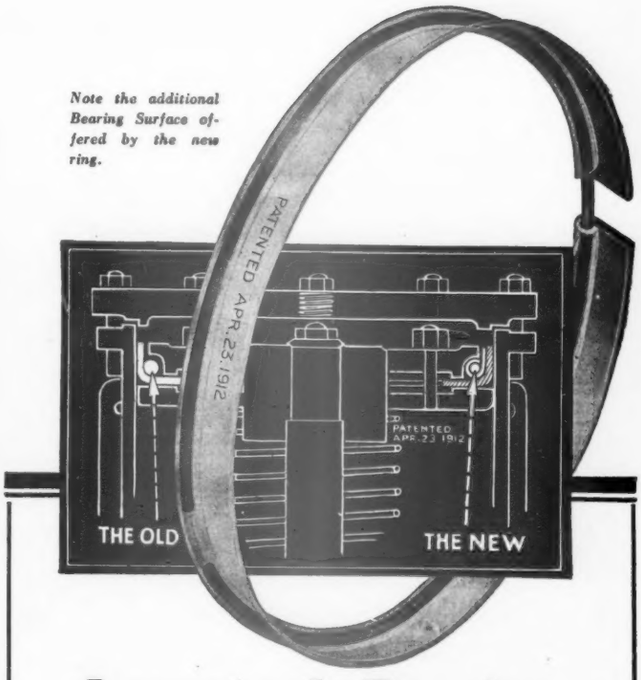
Plants located in

Hyde Park, Mass. Framingham, Mass. Sturtevant, Wis.
Camden, N. J. Berkeley, Cal. Galt, Ontario

Sturtevant
PUTS AIR TO WORK

Sales Engineering Offices and direct representatives in every commercial center of the world

Note the additional Bearing Surface offered by the new ring.



Increased Bearing Surface

The Johns-Manville Expander Ring was designed to assist in overcoming two of the greatest sources of trouble and annoyance in train operation—brake cylinder leakage and packing leather wear.

It will assist in reducing this leakage and wear to the minimum because it has a bearing surface on the cylinder wall equal to four times that of the old fashioned round wire ring.

It is carefully constructed, being made of the best cold rolled steel and English spring wire obtainable. It will work efficiently without maintenance.

Because of its superiority over the old ring, railroad men all over the country have recognized this ring as standard and are accordingly specifying it on car and locomotive equipment.

JOHNS-MANVILLE, Inc., New York City

JOHNS MANVILLE
Railroad Products

Promoting Cooperation and Fair Competition

A B P Standard No. 8
"To COOPERATE with all organizations and individuals engaged in creative advertising work"

THE distance between buyer and seller must be shortened; the roadway which leads from producer to the final consumer must be made straight, broad and smooth; the cost of distribution must be reduced—that is why we pledge ourselves to cooperate with all others engaged in creative advertising work.

We believe that advertising is an economic force, a piece of improved sales machinery, which properly employed, becomes a boon to business and society.

So we ARE cooperating in every movement that will put advertising on a higher plane and make it more efficient. Recently we conducted in the larger cities a 6 - months' course in Publishing and Advertising which was attended by over 1000 employes of our various papers, and for which the students paid over $60,000.00.

As an organization we are active members of The Associated Advertising Clubs of the World, Chamber of Commerce of U. S. A., and of the Audit Bureau of Circulations. Our members are solidly behind every movement for better merchandising and better selling.

A B P Standard No. 9
"To avoid unfair competition"

FAIR - PLAY is ingrained in the American character, and it is one of the practical working standards of The A B P, Inc. It is enforced too—if someone's foot slips a little, he is brought back into line with kindly but insistent firmness.

Concretely, our idea of fair competition is to see who can build the most, not who can tear down the most, but this involves no easy tolerance of evil practices whether in publishing or the fields we serve.

If you have read the preceding advertisements in this series, you will begin to understand that the A B P papers are of superior merit, because they are built upon the solid rock of right principles.

THE ASSOCIATED BUSINESS PAPERS, INC.

JESSE H. NEAL, *Executive Secretary*

HEADQUARTERS: 220 WEST 42nd STREET NEW YORK CITY

A MARK OF SERVICE

Boiler Scalers
Sand Rammers

OLDHAM
NEUMATIC TOOLS

Holders-On
Riveting Hammers

Chipping and Caulking Hammers

WRITE FOR CIRCULAR

GEORGE OLDHAM & SON CO.

BALTIMORE MARYLAND, U.S.A.

BUFFALO CLEVELAND MILWAUKEE NEW YORK PHILADELPHIA ST. CLOUD
CHICAGO DETROIT MONTPELIER PITTSBURGH QUINCY ADAMS ST. LOUIS

Alexander Wilson, Aberdeen Alfred Herbert, Ltd., Yokohama E. Garfield Andrews, Sydney

LUKENS

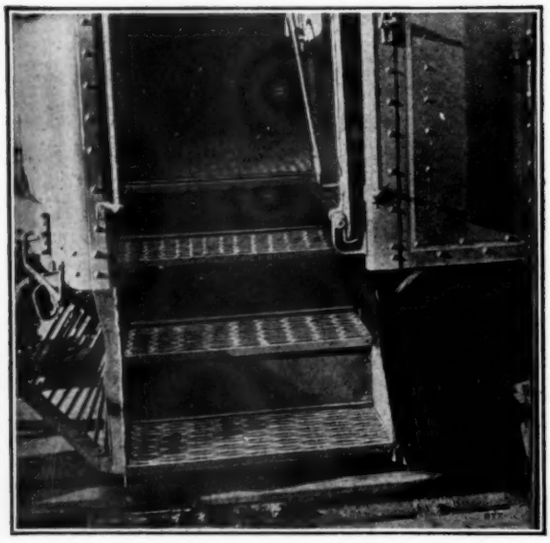
THE Lukens fixed policy of a century has been to keep ahead of steel plate demands. In rolling locomotive fire box and boiler plates 195 inches wide we have made possible greater boiler capacity through ONE PIECE CROWN AND SIDE SHEETS.
Only by eliminating dangerous seams and reducing the number of troublesome rivets to a minimum can the maximum of safety and economy in locomotive boiler construction be attained.

Lukens Steel Corporation
Coatesville Pennsylvania

The World's Largest Plate Mill

IRVING SUBWAY
TRADE MARK (PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING

IRVING SAFSTEP
TRADE MARK (PATENTED) REG. U.S. PAT. OFF.
ABSOLUTELY NON-SLIPPING ALWAYS



A Wear-Proof Safety Step

Strips of steel, riveted edge-on in a solid panel—that's what the **Safstep** is. There's nothing about it to wear out—no lead strips or abrasive inserts to work loose, need replacement, and maybe cause trouble. And wear does not destroy the foot-gripping, non-slipping qualities of the **Safstep**—it is safe first and last, in all weathers, all the time. There's a size and style for your equipment. Write for Catalog 4A33.

IRVING IRON WORKS CO.
LONG ISLAND CITY, N.Y., U.S.A.

Manufacturers of

IRVING SUBWAY
TRADE MARK (PATENTED) REG. U.S. PAT. OFF.
THE FIREPROOF VENTILATING FLOORING

A.R.A. Standard "D" Couplers

Pitt Couplers
Penn Couplers
for Cars and Locomotives

Pitt Pivoted Couplers

Designed on Proper Principles especially for
Passenger Train Cars.

Acid Open Hearth Forging Ingots
and Billets
Rolled Steel Bars

For detailed description — see — CAR AND LOCOMOTIVE CYCLOPEDIAS 1922 Edition

THE McCONWAY & TORLEY CO.
48th St. and A. V. Ry., Arsenal Station,
Pittsburgh, Pa.

CLASS "H"

Hall Friction Draft Gear

High Capacity
Smooth Action
Large Friction Area
Low Pressure on Friction Surfaces
Constant Capacity in Service
Interchangeable in existing sill pockets
Thousands in Service
Application is simple
Protection for Equipment

INVESTIGATE

HALL DRAFT GEAR CORPORATION
Watervliet, N. Y.

PENNSYLVANIA CAR COMPANY

SHARON, PA.

Freight Cars Built, Rebuilt and Repaired,
Underframes, Center Sills, Draft Arms, etc.

Plants at Kansas City, Kan., and Sharon, Pa.

NEW YORK
HOUSTON
ST. LOUIS
CASPER
KANSAS CITY
SAN FRANCISCO
TULSA
BEAUMONT

RAIL ANTI-CREEPERS

THE P. & M. CO.

CHICAGO
NEW YORK
ST. LOUIS
SAN FRANCISCO
CINCINNATI
ST. PAUL
DENVER
RICHMOND

THE P. & M. CO.
LIMITED
McGILL BLDG., MONTREAL

CIE DES APP. P. ET M. (FRANCE)
NO. 7 RUE SCRIBE
PARIS

THE P. & M. CO.
(ENGLAND) LTD
39 GROSVENOR PL. LONDON

Union Steel Casting Co.

PITTSBURGH, PA.

LOCOMOTIVE FRAMES

21 Years Experience in the Manufacture of Carbon Steel Frames

PIONEERS IN VANADIUM STEEL FRAMES

"UNION HIGH-TEST" VANADIUM STEEL FRAMES—MOST RECENT DEVELOPMENT

Write for further information.

Think it Over!

OFFICERS of railways which are not using POLARIZED treatment are doubtless interested in the reports of those who have been obtaining the benefit of its use for several years.

You now have the advantage of the long experience of others to back you up in your recommendation that your road use POLARIZED treatment in bad-water districts.

Mechanical officers can guarantee to executives the following benefits and point to the results obtained by other efficiently operated railways, as proof.

Flue mileage better than doubled.
Fire box maintenance greatly reduced.
Washout expense reduced 50%.
No foaming tendency.
No dependency upon engine crews for use of treatment.
Reduced cost of treatment itself over any other in use.

For detailed description — see — LOCOMOTIVE CYCLOPEDIA 1922 Edition

THINK IT OVER AND WRITE US FOR OUR TREATISE ON BOILER WORK

THE BIRD-ARCHER COMPANY

33 RECTOR STREET, NEW YORK

Northwestern District Office
Peoples Gas Bldg., Chicago, Ill.

Southwestern District Office
Frisco Building, St. Louis, Mo.

For Construction and Maintenance Work

INDUSTRIAL CONVERTIBLE CRANE STEAM SHOVEL

Has proved of maximum efficiency both as a crane and as a digging machine. Dipper sizes ¾ to 1½ yards.

Let us give you full data on this type.

INDUSTRIAL WORKS

BAY CITY MICHIGAN

NEW YORK CHICAGO PHILADELPHIA DETROIT

Sales Engineers in All Principal Cities

1873 BUILDERS OF CRANES AND PILE DRIVERS FOR 50 YEARS 1923

Oldest and Largest Manufacturers of Cranes in the Country. 17 different types. Capacities 5 to 200 tons.

Q & C Universal Guard Rail Clamps

THE Universal design, meaning an interchangeable yoke, for all standard "T" sections of rail makes it only necessary to order new malleable fittings when changing rail sections. The yoke is drop forged with "I" beam construction and made of high carbon steel, heat treated.

PRICES QUOTED ON REQUEST

The Q & C Company

90 West St., NEW YORK

CHICAGO SAN FRANCISCO ST. LOUIS

Chipping, Calking and Beading Hammers

3-SC "Ingersoll-Rand" Chipping Hammer

The greatest labor saving hammer ever invented. More work turned out per hour and less repairs needed per month and year.

Send for Catalog 8000

Ingersoll-Rand Company

General Offices: 11 Broadway, New York

234-PT

ECONOMIZE

BY PURCHASING

GLOBE STEEL SAFE ENDS

CUT TO LENGTHS

Furnished with ends cut square or scarfed, no extra charge for cutting

Every Safe End Inspected by Globe

GLOBE STEEL TUBES CO.

MILLS: 1345 BURNHAM ST., MILWAUKEE

SPECIALISTS

IN THE

Design and Manufacture

OF

Standard-Insulated-Compromise

Rail Joints

THE RAIL JOINT COMPANY

61 Broadway, New York City

American RAIL-ROAD Fence and American STEEL FENCE Posts

Absolute Right-of-Way Protection

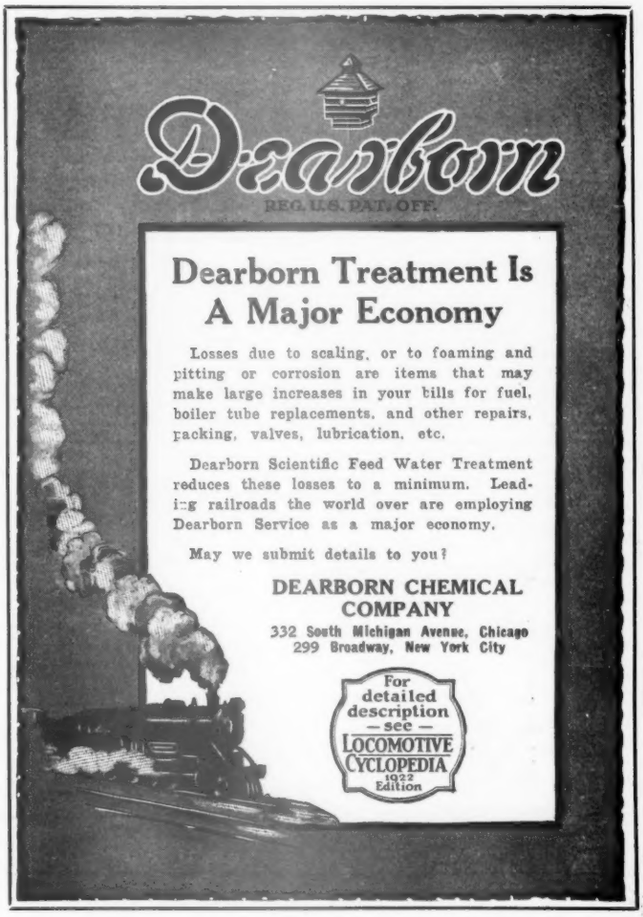
—

Illustrated Catalogue Free

—

American Steel & Wire Company

CHICAGO—NEW YORK


Dearborn
REG. U.S. PAT. OFF.
Dearborn Treatment Is A Major Economy
Losses due to scaling, or to foaming and pitting or corrosion are items that may make large increases in your bills for fuel, boiler tube replacements, and other repairs, packing, valves, lubrication, etc.
Dearborn Scientific Feed Water Treatment reduces these losses to a minimum. Leading railroads the world over are employing Dearborn Service as a major economy.
May we submit details to you?
DEARBORN CHEMICAL COMPANY
332 South Michigan Avenue, Chicago
299 Broadway, New York City
For detailed description — see — LOCOMOTIVE CYCLOPEDIA 1922 Edition

W. H. CROFT, First Vice-President — M. S. PAINE, Secretary-Treasurer

MAGNUS COMPANY
(INCORPORATED)

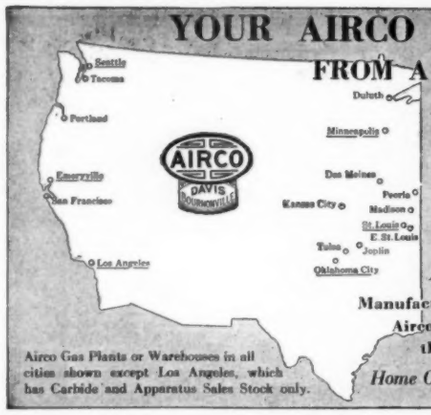
Journal Bearings

AND

Brass Engine Castings

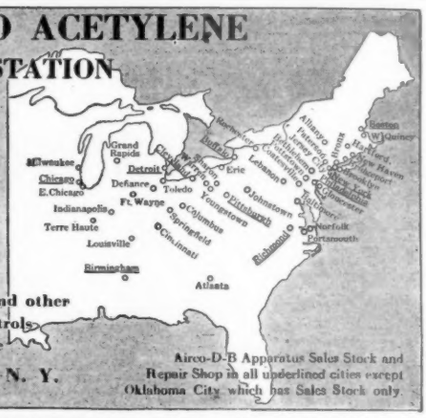
New York Chicago

YOUR AIRCO OXYGEN AND AIRCO ACETYLENE
FROM A NEARBY DISTRIBUTING STATION



Airco-Davis-Bournonville Torches and Specially Designed Welding and Cutting Machines will effect economies in your plant.

Ask your AIRCO DISTRICT OFFICE in nearest underlined city.



AIR REDUCTION SALES CO.

Manufacturer of Airco Oxygen and Airco Acetylene and other Airco and Airco-Davis-Bournonville Products—Controls the Manufacture and Sale of National Carbide

Home Office: 342 Madison Avenue, New York, N. Y.

Airco Gas Plants or Warehouses in all cities shown except Los Angeles, which has Carbide and Apparatus Sales Stock only.

Airco-D-B Apparatus Sales Stock and Repair Shop in all underlined cities except Oklahoma City which has Sales Stock only.

PROGRESSIVE INSPECTION OF
RAILROAD CARS :: RAILS :: TRACK FASTENINGS
LOCOMOTIVES :: BRIDGES, ETC.

Bulletins No. 20 and 21 describing this service in detail will be gladly sent upon request.

PITTSBURGH TESTING LABORATORY
Inspecting Engineers and Chemists -- Pittsburgh, Pa.
OFFICES IN THE PRINCIPAL CITIES

Western Dump Cars Do the Hauling

The Illinois Central has a $122,000,000 construction program in addition to maintenance work, and on practically every project Western dump cars do the hauling.

Western air dump cars are peculiarly adapted to railroad construction and maintenance. They do their work effectively and the cost of upkeep is small. They will OUTWORK and OUTLAST other dump cars.

Western Wheeled Scraper Company
Earth and Stone Handling Equipment
AURORA, ILLINOIS

O. S. DEPENDABLE
Pile Drivers

Designed and manufactured to meet any requirements for the economical handling and driving of piles. Self-propelled collapsible leads.

ORTON & STEINBRENNER CO.

Main Offices
Chicago, Ill.

Factory
Huntington, Ind.

5

BARBER
LATERAL-MOTION DEVICE
1,000,000 in service on 43 Railroads
ROLLER SIDE-BEARINGS
Roller Center Plates
Lessens Wheel Flange Wear
Reduces Friction on Rails 15%

STANDARD CAR TRUCK CO.
McCORMICK BUILDING CHICAGO

OHIO
LOCOMOTIVE CRANES
OHIO LOCOMOTIVE CRANE CO.
SPRING ST. BUCYRUS, OHIO
Chicago Office, Railway Exchange Building. New York, 30 Church St.

UNION SPRING & MANUFACTURING CO.

Coil Springs, Elliptic Springs, Steel Castings, Pressed Steel Spring Plates and Pressed Steel Journal Box Lids

KENSINGTON JOURNAL BOX — All Steel

30 Church St., New York, N. Y.
Fisher Building, Chicago, Ill.
Munsey Building, Baltimore, Md.

WORKS—NEW KENSINGTON, PA.
PITTSBURGH OFFICE—300 GRANITE BLDG.
For detailed description see Car and Locomotive Cyclopedias, 1922 Editions

Todd Building, Louisville, Ky.
Mutual Building, Richmond, Va.
Crozier Building, Philadelphia, Pa.

CAR LIGHTING

"UNDER-FRAME" Electric "PINTSCH" Gas
"PUTNAM" Storage Batteries
"SAFETY" Lighting Fixtures, Electric and Gas

THE SAFETY CAR HEATING AND LIGHTING CO.

NEW YORK CHICAGO PHILADELPHIA BOSTON ST. LOUIS SAN FRANCISCO MONTREAL

MANUFACTURED BY THE SAFETY CAR HEATING AND LIGHTING CO

GREENVILLE STEEL CAR CO.

Manufacture Steel Underframes, Pressed Steel Shapes and Forgings
Rebuild and Repair Steel Freight Cars

Greenville, Penn'a.

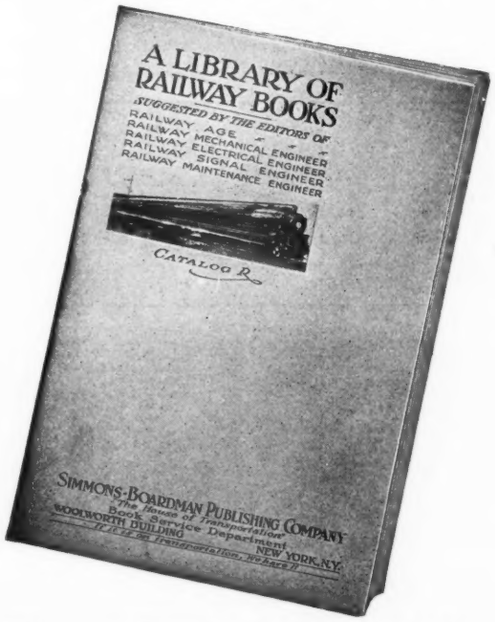
"AXLE SPECIALISTS SINCE 1866"

CAR AXLES

ADDRESS ALL MAIL TO POST OFFICE BOX 515, RICHMOND, VA.

J. R. JOHNSON AND CO., INC.
FORGED STEEL AXLES
FOR LOCOMOTIVES, PASSENGER, FREIGHT AND ELECTRIC CARS
SMOOTH FORGED OR ROUGH TURNED—CARBON OR ALLOY STEEL—PLAIN OR HEAT TREATED
FORGED AND TURNED PISTON RODS, CRANK PINS, LARGE SHAFTS, ROUND BARS, ETC.

The New Revised 1922 Edition of



"A Library of Railway Books" Is Ready for Distribution

Your copy of this "handy guide" is ready. The new edition contains full descriptions, including contents of over 200 railway books. This list has been carefully revised and the latest railway books, issued since the first edition, have been included. The titles cover practically the whole range of railway literature and are written by authors of known experience and are recommended by the editors of our various railway papers. Any book can be selected from this list with perfect confidence that it will be of actual value to you in your daily work.

Send for Your Copy Today—It's FREE

SIMMONS-BOARDMAN PUBLISHING COMPANY,
Book Service Dept.,
30 Church St., New York, N. Y.

Please send me—without cost—my copy of "A Library of Railway Books."

Name .....
Address .....
City .....
State .....
Position.....Co. or R. R.....

Simmons-Boardman Publishing Co.
Book Service Dept.
30 Church St. New York, N. Y.
34 Victoria St., Westminster, S. W. 1.
London, England

Water-Tube Boilers

Babcock & Wilcox—Stirling—Rust

Steam Superheaters

Chain-Grate Stokers

Oil Burners

THE BABCOCK & WILCOX CO.

85 Liberty St., New York

Branch offices at Atlanta, Boston, Chicago, Cincinnati, Cleveland, Dallas, Denver, Detroit, Havana, Honolulu, Houston, Los Angeles, New Orleans, Philadelphia, Phoenix, Pittsburgh, Portland, Ore., Salt Lake City, San Francisco, San Juan, Seattle

Reversible and Interchangeable

Strong Durable

Our Centre Fastening Driver Brake Shoe

MADE ONLY BY

American Brake Shoe and Foundry Co.

30 Church Street, New York

332 So. Michigan Ave., Chicago

West 19th and Grove Sts., Chattanooga, Tenn.

For detailed description see Locomotive Cyclopedia, 1922 Edition

American Bessemer, American Open Hearth and KEYSTONE COPPER STEEL *Black and Galvanized*

SHEETS

We manufacture SHEET AND TIN MILL PRODUCTS for all purposes—Black Sheets, Galvanized Sheets, Corrugated Sheets, Culvert and Flume Stock, Formed Roofing and Siding Products, Special Sheets for Stamping, Stove and Range Sheets, Automobile Sheets in all grades, Electrical Sheets, Roofing Terne Plates, Bright Tin Plate, Etc.

AMERICAN SHEET AND TIN PLATE COMPANY, Pittsburgh, Pa.

Send for weight cards and booklets. Watch for double-page ads.

CAR HEATING

Vapor Car Heating Co., Inc.

80 E. JACKSON B'LV'D.

CHICAGO

NEW YORK, 30 Church St.
BOSTON, 53 State St.
ST. PAUL, Merchant Nat. Bank Bldg.
WASHINGTON, D. C., Munsey Bldg.
PHILADELPHIA, Commercial Trust Bldg.
SAN FRANCISCO, Hobart Bldg.
MONTREAL, CANADA, 65 Dalhousie St.

For detailed description see Car Builders' Cyclopedia, 1922 Edition

REPUBLIC RAILWAY EQUIPMENT CO., Inc.

Successors to

JOLIET RAILWAY SUPPLY CO.

Huntoon Brake Beams
Joliet Brake Beams
Huntoon Truck Bolsters

RAILWAY EXCHANGE BLDG. CHICAGO

BURTON MUDGE, *Pres.* J. H. SLAWSON, *First Vice-Pres.*
C. A. CARSCADIN, *Vice-Pres.—(Sales)*

MISSISSIPPI WIRE GLASS CO.

220 Fifth Ave., New York

Manufacturers of Rolled Sheet Glass for Skylights and Windows, Special Designs Increasing Daylight Illumination

Write for Catalogue and Samples

American Mason Safety Tread Co.

100 PERRY STREET, LOWELL, MASS.

Mason Safety Tread
Stanwood Step and Tread
Stair Nosings
Karbolith Flooring

WRIGLEY BUILDING
CHICAGO

STEEL BACK BRAKE SHOES

SINGER BUILDING
NEW YORK

THE RAILWAY MATERIALS CO.

FALLS HOLLOW STAYBOLTS

made 50 years by an exclusive staybolt mill. If you want IRON THAT WILL NOT SPLIT and a cylindrical hole that admits a 3/16" gauge, use FALLS HOLLOW always.

LONG ENDURING, SAFE, ECONOMICAL, NO MORE WELD TROUBLES—get in the procession under the new slogan:

100% SATISFACTION!

Bars or finished stays. Quality and workmanship guaranteed.

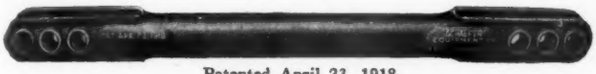
FALLS HOLLOW STAYBOLT CO.

21 E. PORTAGE ST., CUYAHOGA FALLS, OHIO

HAYWARD BUCKETS

...am Shell, Orange Peel, Electric Motor, and Drag Scraper Buckets for all excavating, dredging, and rehandling purposes. Ask for Catalog 48, or consult our engineers gratis.

The Hayward Co., 50 Church St., N. Y.



Patented April 23, 1918

Schaefer Truck Lever Connections

For Freight, Passenger and Engine Tender Equipment

Used by the Largest Railroads in the Country

For detailed description see CAR BUILDERS CYCLOPEDIA 1922 Edition

Made from one-piece open-hearth steel, drop forged jaws, no welds. Lighter in weight, greater strength. Made in styles and sizes to suit all conditions.

Write for Descriptive Literature

SCHAEFER EQUIPMENT CO.

General Offices: Oliver Building, Pittsburgh, Pa.

Protect Your Cars with CARDWELL FRICTION DRAFT GEARS

UNION DRAFT GEAR COMPANY

332 S. MICHIGAN AVE. CHICAGO — TRANSPORTATION BLDG. MONTREAL

DICKINSON DEVICES

Cast Iron Smoke Jacks for Engine Houses
Light Fireproof Jacks for Engine Houses
Aeolus Ventilators made of Cast Iron and Sheet Metal
Cast Iron Chimneys for Small Buildings
Cast Iron Exhaust Heads **Cast Iron Smoke Plates**

PAUL DICKINSON, Inc. 3352 South Artesian Ave., Chicago

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition

Standard Steel Platform

In Use by 281 Companies

Sessions-Standard Friction Draft Gear

In Use by 205 Companies

Both Made by the

Standard Coupler Co., 110 E. 42nd St., New York

MASSACHUSETTS MOHAIR PLUSH CO.

Bay State Brand Plush

ALL STANDARD GRADES FOR CAR SEATS
PLAIN AND FRIEZE

Main Office: 200 Devonshire St., Boston, Mass.
Branch Office: 911 Locust St., St. Louis, Mo.

For detailed descriptions, see Car Builders' Cyclopedia, 1922 Edition

Poles, Timbers — Cross Ties — Piling, Lumber — Paving Block

AM CRE CO Lowry Process Creosoted Wood

AMERICAN CREOSOTING CO., INC.

401 W. Main St., Louisville, Kentucky

Colonial Creosoting Co., Inc., Bogalusa, Louisiana
Georgia Creosoting Co., Inc., Brunswick, Georgia

KREOLITE WOOD BLOCK FLOORS

"Outlast the Factory"

Kreolite Grooved Block

An excellent investment for freight houses and platforms, engine houses, machine shops, etc. Write to-day for our booklet—Factory Floors.

THE JENNISON-WRIGHT COMPANY

Creosoters—Cross Ties and Timbers

65 Kreolite Bldg., Toledo, Ohio

MALLEABLE IRON CASTINGS

ANNUAL CAPACITY, 25,000 TONS

FORT PITT MALLEABLE IRON CO., Pittsburgh, Pa.

HALE & KILBURN CAR SEATS

For Every Class of Service

General Offices and Works: Philadelphia

Offices: New York, Chicago, St. Louis, Washington, San Francisco

Chicago Railway Equipment Co.

BRAKE BEAMS AND BRAKE BEAM SUPPORTS

Chicago

MULE-HIDE PRODUCTS

MULE-HIDE Plastic Car Roofing.
MULE-HIDE Waterproof Canvas for roofs of Passenger Coaches, Cabooses and Cabs.
MULE-HIDE Insulating Paper for Refrigerator Cars.
MULE-HIDE FABRIC, membrane for Waterproofing Concrete Construction.
MULE-HIDE Roofing for Railroad Building, etc.

MULE-HIDE "NOT A KICK IN A MILLION FEET" ROOFING AND SHINGLES

The Lehon Company, 44th to 45th St., on Oakley Ave. **Chicago**

NEWPORT NEWS SHIPBUILDING AND DRY DOCK CO.

BUILDERS OF RAILWAY FREIGHT CARS

Rebuilders of Locomotives and Freight Cars.

Manufacturers of the highest quality of pressed steel repair parts, castings, and forgings conforming to the Marine standard of excellence.

OFFICE AND WORKS, NEWPORT NEWS, VA.

FORT PITT SPRING AND MANUFACTURING CO.

PITTSBURGH, PA.
Manufacturers of
COIL AND ELLIPTIC SPRINGS
FOR
RAILWAY AND ELECTRIC TRACTION SERVICE

DUNER CAR CLOSETS

Enameled Iron Wet or Dry Closets

DUNER CO.

101 S. CLINTON STREET, CHICAGO

For detailed description, see Car Builders' Cyclopedia 1922 Edition

PASSENGER CAR SPECIALTIES

TUCO FLEXOLITH COMPOSITION FLOORING. Sanitary, fireproof, non-absorbent, resilient, dustless. Laid in plastic form, providing a continuous and unbroken surface.

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition

TUCO PRODUCTS CORPORATION
30 Church Street New York
Chicago, Ill. San Francisco, Cal. Houston, Texas
Boston, Mass. Dallas, Texas Montreal, Que., Canada

SANITARY WATER COOLERS
AND ALSO WATER FILTERS
For All Type Rolling Equipment
HENRY GIESSEL CO.
29 S. CLINTON ST., CHICAGO
NEW YORK WASHINGTON, D. C. HOUSTON, TEX.

ROLLED MANGANESE STEEL RAIL

Furnished in all standard sections

Effects great economy in maintenance on all curves for congested traffic

MANGANESE STEEL RAIL COMPANY
Sales Office HILLBURN NEW YORK

GOLD — NEW YORK — USA — HEATING & LIGHTING

VAPOR
AND OTHER TYPES OF
CAR HEATING SYSTEMS
GOLD CAR HEATING & LIGHTING CO.
Bush Terminal 220 36th St. Brooklyn, N. Y.
For detailed description see Car Builders' Cyclopedia, 1922 Edition

For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition

ANTI-FRICTION CAR SUPPORTING MEANS
THE WOODS
SIDE AND CENTER BEARINGS
EDWIN S. WOODS & COMPANY
Ill. Merchants Bk. Bldg. CHICAGO

FRICTIONLESS SIDE BEARINGS
The Wine Railway Appliance Co.
Toledo, O.
For detailed description see Car Builders' Cyclopedia, 1922 Edition.

RAMAPO AJAX CORPORATION

Ajax Manganese Steel Guard Rails
RACOR Rail Braces Clamps, Etc.

RACOR TRADE MARK

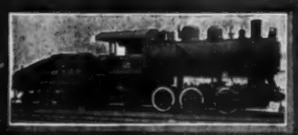
Ramapo Automatic Safety Switch Stands
RACOR Switches Frogs, Etc.

GENERAL OFFICES—HILLBURN, NEW YORK
Chicago New York Superior, Wis. Niagara Falls, N. Y.
Canadian Ramapo Iron Works, Ltd., Niagara Falls, Ont.

JOURNAL BOX LIDS **ASCO PRESSED STEEL** *TRUCK SPRING PLATES*

For detailed description, see Car Builders' Cyclopedia 1922 Edition

ALLEGHENY STEEL COMPANY
Brackenridge, Pa.



PORTER LOCOMOTIVES
58 YEARS THE BEST
H. K. PORTER Co.
PITTSBURGH, PA.

ELWELL-PARKER
Electric
TRUCKS AND TRACTORS
For Freight and Passenger Terminal, Storage Battery Warehouse, Baggage and Shop Trucks.

The Elwell-Parker Electric Co.
"Pioneer Builders Electric Industrial Trucks"
Cleveland, Ohio, U. S. A.
Offices in All Principal Cities

EXTENSION SIDE DUMP CARS

PITTSBURGH

30 cu. yds. Level Full;
43 cu. yds. Normal Loading
100,000 pounds A. R. A. Capacity

CLARK CAR COMPANY
PITTSBURGH, PA.
Boston
683 Atlantic Ave.

For detailed description see Car Builders Cyclopedia, 1922 Edition

MUDGE MOTOR CARS
Trailers — Push Cars
Pressed Steel Wheels
Mudge & Company
Manufacturers—Railroad Equipment
Railway Exchange Bldg. · CHICAGO

100 New Users in the Last Nine Months
KASS SAFETY TREADS
Step Boxes and Complete Flights
HIGH in efficiency and lasting qualities
LOW in weight, initial and upkeep costs
MORTON MANUFACTURING COMPANY
5133-43 W. Lake St., Chicago

Ashton High Grade
Pop Valves—Steam Gauges
the quality standard for over 40 years
Exclusive features insuring greatest efficiency and durability

THE ASHTON VALVE CO.
New York, Boston and Chicago

BOSS LOCK NUTS
UNQUESTIONED DEPENDABILITY
American Bolt Corporation
BOSS NUT DIVISION, Chicago, U. S. A.

STEEL
'CARNEGIE'
When you think of Steel-think of Carnegie

DARA
Rod & Channel
DAVIS
Solid Truss
BRAKE BEAMS
DAVIS BRAKE BEAM COMPANY
1602 Oliver Bldg. Pittsburgh, Pa.
First National Bank Roanoke, Va.
Johnstown, Pa.

DETROIT
SEAMLESS STEEL TUBES
DETROIT SEAMLESS STEEL TUBES CO.
DETROIT MICH.
District Offices: 332 South Michigan Ave., Chicago; Guardian Bldg., Cleveland; 342 Madison Ave., New York; Front & Freeman Sts., Cincinnati, O.; 22 Battery St., San Francisco, Cal.

Edgewater Steel Co.
PITTSBURGH, PA.
Locomotive Tires
Steel Tired Wheels
Car Wheel Tires
Rolled Steel Wheels

Let us bid on your requirements of
FORGINGS
STEEL CAR FORGE CO.
PITTSBURGH

BOYDEN SIX WHEEL CO-ORDINATING TRUCK
No Nuts Bolts or Rivets
Free Radial Axle Movement

PATENTED & PATENTS PENDING
BOYDEN STEEL CORPORATION
Standard Oil Bldg. BALTO, MD.

UNARCO
Asbestos and Rubber Packings for Railroad Use
Asbestos Insulating Materials
UNION ASBESTOS & RUBBER CO.
231 So. Wells St., Chicago, Ill.

Robert M. Lucas Co.
CREATORS *and* MAKERS *of*
LUCAS CEMENT
1955 West Thirty-First Street
Lafayette 0545 CHICAGO
"Through all changes some things endure"

Heywood-Wakefield
CAR SEATS
of pressed steel for all classes of Passenger Service. Rattan for covering seats and for Snow Sweepers.
HEYWOOD-WAKEFIELD CO.
Factory at WAKEFIELD, MASS.
For detailed description — see — CAR BUILDERS CYCLOPEDIA 1922 Edition
Offices at New York, Chicago, San Francisco

Fairmont
Section Motor Cars
Inspection Cars
Gang and Power Cars
Push Cars and Trailers
Wheels, Axles and Hyatt Roller Bearings
Engines, Power Decks and Safety Appliances for Motor Cars
Send for Bulletins
Fairmont Railway Motors, Inc., Fairmont, Minn.

Nichols Transfer Tables
Turntable Tractors
Geo. P. Nichols & Bro. 2139 Fulton Street Chicago

ELESCO
SUPERHEATERS
FEED WATER HEATERS
and
EXHAUST STEAM INJECTORS
Save Fuel—Increase Capacity
THE SUPERHEATER CO.
General Offices: 17 E. 42nd St., N. Y.
Chicago: Peoples Gas Bldg.
For Canada: The Superheater Co., Ltd., Montreal

MACHINE TOOLS
For the Locomotive and Car Building Shop
For Railroad Repair Shops and General Repair Shops—Complete equipment including Cranes and Steam Hammers
NILES-BEMENT-POND CO.
111 BROADWAY, NEW YORK

American Water Softener Company
Fairhill P. O. Station, Philadelphia, Pa.
SPECIALISTS FOR 20 YEARS IN RAILROAD WATER PURIFICATION

RYERSON MACHINERY
We manufacture a complete line of railroad shop machinery, including Lathes, Planers, Shapers, Drilling Machines, Milling Machines, Hammers, Friction Saws, Punches, Shears, Bending Rolls, Riveters, Flue Shop and Spring Equipment, etc.
Write for complete information and prices
JOSEPH T. RYERSON & SON INC.
CHICAGO ST. LOUIS CINCINNATI DETROIT BUFFALO NEW YORK

VICTOR
ON EVERY HEAD
VICTOR RIVETS
Boiler—Ship—Structural—Tank Rivets
Knuckle and Air Brake Pins
THE CHAMPION RIVET COMPANY
Largest Rivet Manufacture in the World
MAIN OFFICE AND WORKS *Cleveland, Ohio*
WESTERN PLANT *East Chicago, Ind.*

EXCHANGE SAWMILLS SALES CO.
LONG BLDG. KANSAS CITY, MO.
Grain Doors—Car Material—Long Leaf Bridge Timbers
SPECIALISTS IN YELLOW PINE LUMBER
(See advertisement in issue of December 22, 1923—Page 6)

PROFESSIONAL DIRECTORY

The Arnold Company
ENGINEERS—CONSTRUCTORS
Specialists in the planning of railroad properties and their construction. Offering complete service from conception to operation, eliminating hazardous division of responsibility and insuring maximum economy.
105 South La Salle St., Chicago

Charles Evan Fowler
M. Am. Soc. C. E. M. Eng. Inst. Can. Consulting Civil Engineer.
BRIDGES, FOUNDATIONS
Reinforcements of Long Spans a Specialty
New York City, 25 Church St.

JOHN E. MUHLFELD
Consulting Engineer
RAILWAY AND INDUSTRIAL EQUIPMENT, FACILITIES INVESTIGATIONS AND VALUATIONS
25 Broad Stret, New York

C. E. SMITH & CO.
Consulting Engineers
2073 Railway Exchange, St. Louis.
Investigations, Reports, Appraisals, Expert Testimony, Bridge and Structural Work, Electrification, Grade Crossing Elimination, Foundations, Docks, Water Supply, River and Flood Protection, Drainage and Sanitation.

J. ROWLAND BIBBINS
Engineer
TRANSPORTATION
Terminal Surveys and Development, adapting motor-transport, Transit, Port & City Plans. Economic Studies in Traffic Movement & Relief.
EXPERIENCE IN 20 CITIES
921 15th St. N. W. Washington, D. C.

GULICK-HENDERSON CO.
Inspecting Engineers
Metallurgists—Chemists
Specialists in the inspection of Railway Equipment, Materials for Cars and Locomotives, Rails, Track Materials, Structural Steel, Cement.
New York *Pittsburgh*
Chicago *Philadelphia*

Locomotive Coaling Plants
Sand Drying Plants
Cinder Handling Plants
Roberts and Schaefer Co.
Engineers and Contractors
CHICAGO

STONE & WEBSTER
Incorporated
Examinations Reports Appraisals
on
Industrial and Public Service Properties
New York Boston Chicago

BATTEY & KIPP
INCORPORATED
Engineers
Complete Railroad Shops and Locomotive Terminals
Power Plants
Industrial Properties
123 W. Madison St., Chicago

McClellan & Junkersfeld
INCORPORATED
Engineering and Construction
NEW YORK
45 WILLIAM ST.
Chicago Philadelphia

Dwight P. Robinson Co.
Incorporated
Engineers and Contractors
With which is consolidated
Westinghouse, Church, Kerr & Co., Inc.
Railroad Shops and Terminals
Power Plants Electrification
Coaling Stations
125 East 46th St., New York
Chicago Philadelphia Youngstown
Los Angeles Montreal Rio de Janeiro

It will pay you to use space in this Directory.

SWITCH ENGINE WANTED

60 TO 70 TONS

Must be first class and up to date. Mail age, pressure, photo, full particulars and cash price. Address Box 562, RAILWAY AGE, 30 Church St., New York City.

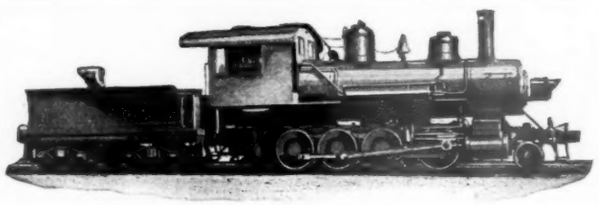
WANTED

Manuscripts dealing with all phases of railroad work are needed by a publishing house of worldwide prominence in the railway field. Railroad men who are willing to put the results of their practical experience on paper can find a market for their material and obtain substantial returns by taking advantage of this opportunity. For further particulars address Box 564, RAILWAY AGE, 30 Church Street, New York City.

PITTSBURGH SPRING & STEEL CO.

1417 Farmers Bank Building, Pittsburgh, Pa.
Makers of Elliptic and Spiral **SPRINGS** of Every Description
Quality and Workmanship Guaranteed
New York Agencies Chicago
2838 Grand Central Terminal 1411 Fisher Bldg.
For detailed description see Car Builders' Cyclopedia, 1922 Edition

ROBERT W. HUNT CO., ENGINEERS
BUREAU OF
INSPECTION TESTS *and* CONSULTATION
CHEMICAL AND PHYSICAL TESTS
ESTABLISHED OFFICES IN
CHICAGO NEW YORK PITTSBURGH ST. LOUIS SAN FRANCISCO
SEATTLE LONDON MONTREAL TORONTO VANCOUVER



4—Duplicates, 18" x 26", 67 ton Consolidation type, 41" driving wheel centers, 13' 4" rigid wheel base, 200 lbs. steam pressure; tractive power 32,180 lbs., I. C. C. ENTIRE NEW BUTT STRAP BOILERS IN 1916.

6—Duplicates, 21" x 28", 92 ton Consolidation type, piston valve, superheated, outside valve gear, 200 lbs. steam pressure, tractive power 38,000 lbs.

Other Locomotives rebuilt and ready, 5 to 100 tons. Also Steel Underframe Combination Cars, etc.

SOUTHERN IRON & EQUIPMENT COMPANY
(Est. 1889)
General Offices and Plant ATLANTA, GA.
Branches NEW ORLEANS, PITTSBURGH, SEATTLE

O. M. EDWARDS COMPANY, Inc.
Corner Plum & Solar Sts.
SYRACUSE, N. Y.
CHICAGO NEW YORK
Canadian Representative:
Lyman Tube & Supply Co., Ltd., Montreal and Toronto.
For detailed description see Car Builders' Cyclopedia, 1922 Edition

PASSENGER COACH EQUIPMENT
Window Fixtures
All Metal Sash Balances
Metal Stop Casings
Top, Bottom & Side Weather Strips
Metal Extension Platform Trap Doors
Trap Door Locks

Help and Situation Wanted advertisements appearing in this Department are payable in advance at 5c. a word an insertion, and 5c. per word for ten words in address, Minimum charge $1.00 an insertion. Display Help and Situation Wanted advertisements $3.00 a column inch (1" deep x 1⅝" wide) an insertion. For Sale and other Classified Advertisements $3.00 a column inch (1" deep x 1⅝" wide). Any number of inches may be used. Copy should be in the New York Office of the Railway Age, 30 Church Street, by Saturday noon to insure insertion in the following week's issue.

POSITION OPEN

SALARIED positions, $2,500 to $25,000 upward; executive, technical, administrative engineering, manufacturing, professional, managing, financial, etc., all lines. If you are qualified, and receptive to tentative offers for a new connection, you are invited to communicate in strict confidence with the undersigned who will conduct preliminary negotiations for such positions. A method is provided through which you may receive overtures in confidence, without jeopardizing present connections, and in a manner conforming strictly to professional ethics. Send name and address only; preliminary particulars will be sent without obligating or compromising you in any way. R. W. Bixby, Inc., 402 Lockwood Building, Buffalo, N. Y.

POSITION OPEN

FREIGHT Car Designing Engineer, American practice. Must be capable of making stress analyses and calculations for complete car. Salary $250 per month. Address Box 561, RAILWAY AGE, 30 Church St., New York City.

EXPERIENCED Freight Car Draftsman, American practice. Salary $190 per month to start. Address Box 560, RAILWAY AGE, 30 Church St., New York City.

A REPRESENTATIVE to sell Enamels, Varnishes, Paints, etc., to the eastern railroad trade. Must be experienced in this line and have established acquaintance. Address Box 565, RAILWAY AGE, 30 Church Street, New York City.

POSITION WANTED

AS Superintendent short steam road by an efficiency expert capable of obtaining highest efficiency. Experienced in Accounting, Traffic, Transportation, Operation and Maintenance. Address Box 563, RAILWAY AGE, 30 Church Street, New York City.

EDUCATIONAL

SEND for Free Special Bulletin and learn how to increase your knowledge of practical railroad work and fit yourself for promotion. The Railway Educational Bureau, Omaha, Nebr.

FOR QUICK RESULTS

If you are looking for a position, or in need of a man, put your advertisement in this Classified Section.

WANTED

We are in market for a locomotive device having merit, either to distribute, or to manufacture and sell. Address Box 555, RAILWAY AGE, 30 Church Street, New York City.

WANTED

Steel Piling

Carload or more of 300 wall feet 25-30-ft. lengths. 180 wall feet 35-45-ft. lengths. Address Box 553, RAILWAY AGE, 30 Church St., New York City.

FOR SALE
LOCOMOTIVES & PROVISION BOX CARS

10—90-ton Consolidation type road locomotives, 21" x 30" cylinders, wide firebox, piston valves.
300, Provision-Box cars, 50% with 80,000 lbs. capacity full steel underframes.

THOMAS F. CAREY COMPANY
120 Liberty Street **New York, N. Y.**

NEW AND RELAYING RAILS
TRACK EQUIPMENT. *GUARANTEED*

L.B. FOSTER CO.
PITTSBURGH, PENNSYLVANIA
New York-Jersey City-Philadelphia-Hamilton, O.

American Short Line Railroad Association
USED EQUIPMENT AND MATERIAL
Clearing House

If you want to buy or sell Locomotives, Cars, Rails, Bridges or anything used on a Railroad write

James W. Cain, Manager of Purchases
Consolidated Purchasing Agency
1831-4 McCormick Bldg., Chicago, Ill.

RELAYING RAILS

80 and 90 lb.

Full complement of Angle Bars. Shipment January and February, 1924.

STANDARD RAIL & STEEL CO.
Phone Olive 3654—905 Planters Bldg., St. Louis, Mo.

WANTED

Good accounts. Staple articles such as malleables, cast steel, bolts and nuts, fire brick, etc., from reliable concerns who are not represented in Chicago, with parties who have good connections. Address Box 566, RAILWAY AGE, 30 Church Street, New York City.

CARS

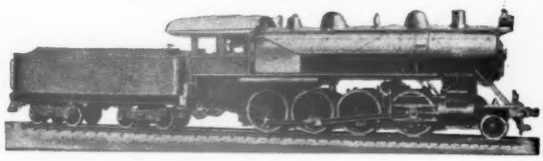
32—Steel Underframe, 100,000 lb., bottom side dump, National Ballast.
16—Steel Underframe, 100,000 lb., Semi "A" bottom side, Ballast.

ZELNICKER IN ST. LOUIS
Rails, Piling, Equipment, etc.

Use the Get Together Department for *results*.

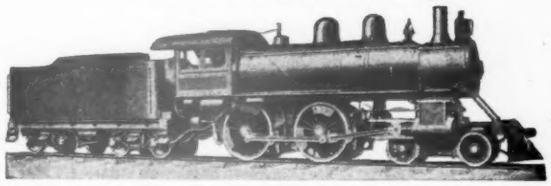
FOR SALE
Repaired Locomotives

95 Ton Consolidations



Builder—American Locomotive Co.
Cylinders—21" x 30"—Drivers—44" Centers.
Weight on drivers—170,000 lbs.—Boiler Pressure 185 lbs.

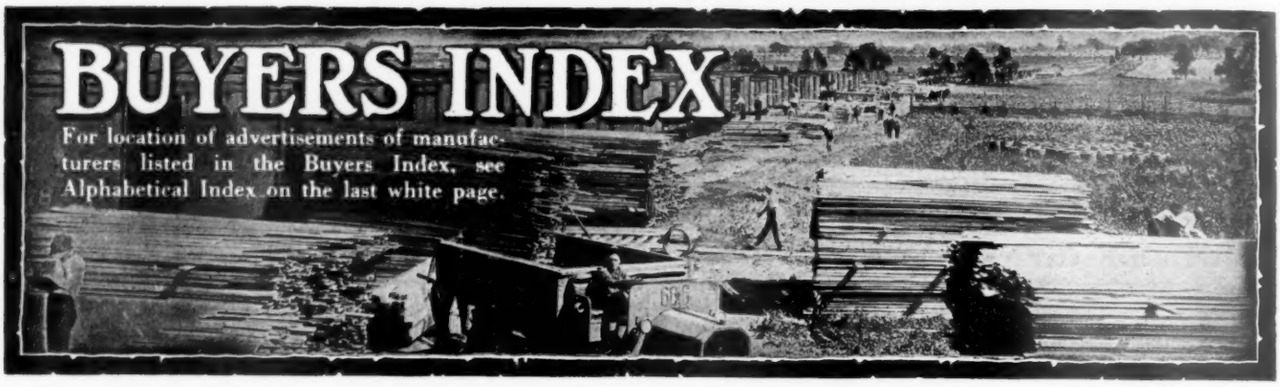
75 Ton—8-Wheel Passenger



Builder—American Locomotive Co.
Cylinders—19" x 26"—Drivers—66" Centers.
Weight on drivers—102,300 lbs.—Boiler Pressure 200 lbs.

ALSO—65 TON—8-WHEEL PASSENGER
SIX-WHEEL SWITCHERS
WRITE FOR PRICES AND SPECIFICATIONS

H. KLEINHANS COMPANY
Union Trust Building **Pittsburgh, Pa.**


BUYERS INDEX
For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last white page.

Acetylene, Dissolved.
Air Reduction Sales Co.

Air Lifts.
Ingersoll-Rand Co.

Air Reservoir Joints — (See Joints, Air Reservoir).

Alloy Steel.
Central Steel Co.

Angle Bars — (See Joints, Rail).

Angles, Channels and Tees—(See Shapes, Structural).

Arch, Locomotive Brick.
American Arch. Co.

Arresters, Lightning.
General Electric Co.
P. & M. Co., The.

Asbestos Protected Metal.
Johns-Manville, Inc.

Ash Conveyors.
Industrial Works.
McMyler Interstate Co.

Automatic Train Control.
Miller Train Control Corp.

Axles, Car and Locomotive.
American Locomotive Co.
Baldwin Locomotive Works, The.
Johnson & Co., J. R.
Lima Locomotive Works.
Standard Steel Works.

Bars, Concrete Reinforcing.
American Steel & Wire Co.
Carnegie Steel Co.
Illinois Steel Co.

Bars, Iron and Steel.
Carnegie Steel Co.
Central Steel Co.
Falls Hollow Staybolt Co.
Illinois Steel Co.
McConway & Torley Co.
Ryerson & Son, Joseph T.

Batteries, Electric Storage.
Safety Car Heating & Lighting Co.

Bearings, Axles, Motor Push Car.
Fairmont Railway Motors, Inc.

Bearings, Center.
Chicago Ry. Equipment Co.
Miner, W. H.
Symington Co., T. H.
Woods & Co., Edwin S.

Bearings, Journal.
Magnus Co., Inc.

Bearings, Side.
American Steel Foundries.
Chicago Ry. Equipment Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.
Standard Car Truck Co.
Standard Coupler Co.
Wine Ry. Appliance Co.
Woods & Co., Edwin S.

Bending and Straightening Machines.
Ryerson & Son, Joseph T.

Billets, Steel.
Central Steel Co.
Illinois Steel Co.
Inland Steel Co.
McConway & Torley Co.
Tacony Steel Co.

Blocks, Creosoted.
American Creosoting Co.
Central Coal & Coke Co.
International Creosoting & Construction Co.
Jennison Wright Co.
Long-Bell Lumber Co., The

Blooms, Steel.
Central Steel Co.
Tacony Steel Co.

Blower Fittings, Automatic Smokebox.
Barco Mfg. Co.

Blow Off Line Joints, Roundhouse—(See Joints, Etc.).

Boilers, Locomotive.
American Locomotive Co.
Baldwin Locomotive Works.

Boilers, Scale Proof.
Industrial Works.
Lima Locomotive Works.

Boilers, Water Tube.
Babcock & Wilcox.

Bolsters, Steel.
American Steel Foundries.
Commonwealth Steel Co.
Illinois Steel Co.
Republic Railway Equip. Co.

Bolts and Nuts.
American Bolt Corp. (Boss Nut Div.).
Foster Co., L. B.
National Malleable Castings Co.
Ryerson & Son, Joseph T.

Bolts, Patch.
Falls Hollow Staybolt Co.

Bolts, Track.
Illinois Steel Co.

Books.
Simmons-Boardman Pub. Co.

Bonding Rail Outfits.
Ingersoll-Rand Co.

Boosters, Locomotive.
Franklin Ry. Supply Co.

Booths, Telephone.
Dickinson, Inc., Paul.

Boring and Turning Mills, Vertical.
Niles-Bement-Pond Co.

Braces, Rail.
Fort Pitt Malleable Iron Co.
National Malleable Castings Co.
Ramapo Ajax Corp.
Q & C Co., The.

Brake Beams.
American Steel Foundries.
Chicago Ry. Equipment Co.
Davis Brake Beam Co.
Republic Railway Equip. Co.

Brake Beams—Supports.
American Steel Foundries.
Chicago Ry. Equipment Co.
Davis Brake Beam Co.

Brake Forging, Pins, Levers, Etc.
American Steel Foundries.
National Railway Appliance Co.
Schaefer Equipment Co.
Steel Car Forge Co.

Brake Heads.
American Steel Foundries.
Chicago Ry. Equipment Co.
National Malleable Castings Co.

Brake Jaws.
National Malleable Castings Co.
Schaefer Equipment Co.
Steel Car Forge Co.

Brake Shoes.
American Brake Shoe & Fdy. Co.
Fort Pitt Malleable Iron Co.
Railway Materials Co.

Brakes, Air.
Westinghouse Air Brake Co.

Brakes, Clasp.
American Steel Foundries.

Brakes, Electric.
Westinghouse Air Brake Co.

Brakes, Hand.
Miner, W. H.
Wine Ry. Appliance Co.

Brick Locomotive Arch.
American Arch Co.

Bridge Builders.
Arnold Co.
Austin Co., The
Fowler, Chas. Evan.

Buckets, Clam Shell.
Brown Hoisting Machy. Co.
Browning Co.
Industrial Works.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Buckets, Grab.
American Hoist & Derrick Co.
Brown Hoisting Machy. Co.
Browning Co.
Hayward Co.
Industrial Works.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Buffers, Friction.
Miner, W. H.
Westinghouse Air Brake Co.

Buffers, Radial.
Franklin Ry. Supply Co.

Buildings, Iron, Steel and Steel Concrete.
Arnold Co.
Austin Co., The
McLellan & Junkersfeld, Inc.
Robinson Co., Dwight P.
Stone & Webster.
White Eng. Corp., J. G.

Bulldozers.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Burners, Bunsen, Oxygen, Gas.
Air Reduction Sales Co.

Cables, Electric.
American Steel & Wire Co.
Kerite Insulated Wire & Cable Co.

Cableways—(See Tramways).

Calcium Carbide.
Air Reduction Sales Co.

Car Ends, Steel.
Chicago Cleveland Car Roof Co.

Car Lighting Equipment — (See Lighting, Car Equipment).

Carlines.
Chicago Cleveland Car Roofing Co.
Standard Ry. Equipment Co.

Car Material, Wood.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.

Car Parts and Appliances.
Pullman Co., The.

Car Steps, Safety.
American Mason Safety Tread Co.
Irving Iron Works.

Cars, Dump.
Clark Car Co.
McMyler Interstate Co.
Western Wheeled Scraper Co.

Cars, Freight.
Greenville Steel Car Co.
Newport News Shipbuilding & Dry Dock Co.
Pullman Co., The.
Ralston Steel Car Co.

Cars, Gasolene, Motor.
Brill Co., J. S.

Cars, Hand and Push.
Fairmont Railway Motors, Inc.
Mudge & Co.

Cars, Industrial.
Brill Co., J. G.
Foster, L. B., Co.

Cars, Motor (Section).
Clark Car Co.
Fairmont Railway Motors Co.
Mudge & Co.

Cars, Motor Inspection.
Fairmont Railway Motors, Inc.

Cars, Ore.
Brill Co., J. G.
Clark Car Co.

Cars, Passenger.
Brill Co., J. G.
Pullman Co., The.
Ralston Steel Car Co.

Cars, Rebuilt and Repaired.
Greenville Steel Car Co.
Ralston Steel Car Co.

Cars, Second-Hand.
Zelnicker Supply Co., Walter A.

Cars, Self-Propelled, Passenger.
Brill Co., J. G.

Cars, Tank.
Pennsylvania Car Co.

Castings, Brass and Bronze.
Magnus Co., Inc.

Castings, Gray Iron.
American Brake Shoe & Fdry. Co.
American Locomotive Co.
Baldwin Locomotive Works.
Ramapo Ajax Corp.

Castings, Gun Iron.
Hunt-Spiller Mfg. Corp.

Castings, Malleable Iron.
Chicago Railway Equipment Co.
Fort Pitt Malleable Iron Co.
P. & M. Co., The.

Castings, Steel.
American Locomotive Co.
American Steel Foundries.
Edgewater Steel Co.
McConway & Torley Co.
Newport News Shipbuilding & Dry Dock Co.
Standard Steel Works.
Union Spring & Mfg. Co.
Union Steel Casting Co.

Castings, Steel Vanadium.
Union Steel Casting Co.

Cement, Car Roofing.
Lucas Co., Robt. M.

Center Plate — (See Bearings, Center).

Charcoal, Iron.
Parkesburg Iron Co.

Chemists.
Dearborn Chemical Co.
Hunt & Co., Robert W. Pittsburgh Testing Laboratory.

Chimneys, Cast Iron.
Dickinson, Inc., Paul.

Cinder Handling Plants.
Roberts & Schaefer Co.

Clamps, Flanging.
Ryerson & Son, Joseph T.

Clamps, Guard Rail.
Q & C Co., The.

Clamps, Hose.
Westinghouse Air Brake Co.

Clamps, Pipe.
Franklin Ry. Supply Co.

Cleaners, Flue.
Ryerson & Son, Joseph T.

Closets, Water.
Duner Co.

Coach and Coach Yard Steam Joints—(See Joints, Etc.).

Coal, Ore and Ash Handling Machines.
Brown Hoisting Machinery Co.
Industrial Works
McMyler Interstate Co.
Orton & Steinbrenner Co.
Roberts & Schaefer Co.

Coaling Stations.
Roberts & Schaefer Co.

Cocks, Angle.
Westinghouse Air Brake Co.

Cocks, Cylinder.
U. S. Metallic Packing Co.

Compounds, Boiler.
Bird-Archer Co., The
Dearborn Chemical Co.

Compressors, Air.
Ingersoll-Rand Co.
Worthington Pump & Mchy. Corp.

Condensers.
Ingersoll-Rand Co.

Conduits, Metallic Flexible.
Barco Mfg. Co.
Franklin Railway Supply Co.

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

BUYERS INDEX

Connections, Truck Lever.
Schaefer Equipment Co.

Connectors, Automatic T. P. —(See Train Pipe Connectors, Automatic).

Control Devices, Train Speed.
Miller Train Control Corp.

Controllers, Electrical.
General Electric Co.

Conveying Machinery.
Brown Hoisting Mach. Co.
Industrial Works
McMyler Interstate Co.
Orton & Steinbrenner Co.

Conveyor, Ash—(See Coal, Ore and Ash Handling Mach.).

Coupler Pockets—(See Draft Yokes).

Couplers.
American Steel Foundries.
Franklin Ry. Supply Co.
McConway & Torley Co.
National Malleable Castings Co.
Standard Coupler Co.
Westinghouse Air Brake Co.

Couplings, Hose.
Fort Pitt Malleable Iron Co.
Ingersoll-Rand Co.
Westinghouse Air Brake Co.

Covering, Seat, Rattan.
See Rattan

Cranes, Electric Traveling.
Brown Hoisting Mchy. Co.
Industrial Works.
Morgan Engineering Co.
Niles-Bement-Pond Co.

Cranes, Gantry.
Brown Hoisting Mchy. Co.
Industrial Works
McMyler Interstate Co.
Morgan Engineering Co.
Niles-Bement-Pond Co.
Orton & Steinbrenner Co.

Cranes, Jib.
Brown Hoisting Mchy. Co.
Industrial Works
McMyler Interstate Co.
Morgan Engineering Co.
Niles-Bement-Pond Co.

Cranes, Locomotive.
American Hoist & Derrick Co.
Brown Hoisting Mchy. Co.
Browning Co.
Industrial Works
McMyler Interstate Co.
Ohio Locomotive Crane Co.
Orton & Steinbrenner Co.

Cranes, Portable.
American Hoist & Derrick Co.
Brown Hoisting Mchy. Co.
Elwell-Parker Electric Co.
Industrial Works
McMyler Interstate Co.
Orton & Steinbrenner Co.

Cranes, Tractor.
Industrial Works.
McMyler Interstate Co.

Cranes, Wrecking.
Brown Hoisting Mchy. Co.
Industrial Works
McMyler Interstate Co.
Orton & Steinbrenner Co.

Crank Pins — (See Pins, Crank).

Creosote.
American Creosoting Co.
International Creosoting & Construction Co.
Jennison Wright Co.

Cross-Arms.
Great Southern Lumber Co.

Crossheads and Shoes.
Baldwin Locomotive Works, The
Barco Mfg. Co.

Crossings — (See Frogs and Crossings).

Crushers, Coal.
Brown Hoisting Mach. Co.
Orton & Steinbrenner Co.
Worthington Pump & Mchy. Corp.

Culverts.
American Rolling Mill Co., The
American Sheet & Tin Plate Co.

Curtains and Fixtures, Car Window.
Morton Mfg. Co.

Curtains & Fixtures, Car Vestibule.
Morton Mfg. Co.

Cutters, Flue.
Ryerson & Son, Joseph T.

Cutting and Welding Apparatus (Oxy-Acetylene).
Air Reduction Sales Co.

Cyclopedias, Railway.
Simmons-Boardman Pub. Co.

Cylinders, Gas, Acetylene, Etc.
Air Reduction Sales Co.

Derails
Q. & C. Co., The

Derricks.
Industrial Works.
McMyler Interstate Co.

Devices, Safety Motor Car.
Fairmont Railway Motors, Inc.
Mudge & Co.

Diaphragms, Buffing, Mechanism.
Morton Mfg. Co.

Diaphragms for Cars, Canvas and Steel.
Morton Mfg. Co.

Ditching Machinery.
American Hoist & Derrick Co.
Browning Co.
Industrial Works

Door Fixtures—(See Fixtures, Car Door).

Door, Locomotive, Fire-Box.
Franklin Railway Supply Co.

Doors, Car.
Miner, W. H.
Wine Ry. Appliance Co.

Doors, Grain.
Exchange Sawmills Sales Co.

Doors, Steel.
Morton Mfg. Co.

Draft Arms.
American Steel Foundries.

Draft Gears.
Fort Pitt Malleable Iron Co.
Hall Draft Gear Corp.
Miner, W. H.
Standard Coupler Co.
Symington Co., T. H.
Union Draft Gear Co.
Westinghouse Air Brake Co.

Draft Yokes.
American Steel Foundries.
Miner, W. H.
Steel Car Forge Co.

Drawbar Centering Device.
Miner, W. H.

Draw-bars, Unit Safety.
Franklin Railway Supply Co.

Dredging Machinery.
Industrial Works.

Drill Steel, Rock and Steel Sharpeners.
Ingersoll-Rand Co.

Drilling Machines, Pneumatic.
Ingersoll-Rand Co.

Drilling Machines, Rock.
Ingersoll-Rand Co.
Oldham & Son Co., Geo.

Drilling Machines, Upright and Radial.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Drills, Close Corner.
Ingersoll-Rand Co.

Drills, Pneumatic.
Ingersoll-Rand Co.

Drills, Track and Bonding.
Ingersoll-Rand Co.

Drinking Fountains.
Giessel Co., Henry.

Driving Boxes (Extended Main).
Franklin Railway Supply Co.

Drop Door Mechanism.
Wine Railway Appliance Co.

Dynamos — (See Generators, Electric, Economizers, Fuel).

Economizers, Fuel.
Sturtevant Co., B. F.

Electrical Supplies.
General Electric Co.

Electrification, Railroad.
General Electric Co.
McLellan & Junkersfeld, Inc.
Robinson Co., Dwight P.
Smith & Co., C. E.

Ends, Steel.
Chicago-Cleveland Car Rfg. Co.
Hutchins Car Roofing Co.
Union Metal Products Co.

Engineers and Contractors.
Roberts & Schaefer Co.
Robinson Co., Dwight P.
Stone & Webster
Watson Engineering Co.
White Eng. Corp., J. G.

Engineers, Construction.
Arnold Co.
Austin Co., The
McLellan & Junkersfeld, Inc.
Roberts & Schaefer Co.
Robinson Co., Dwight P.
Stone & Webster.
Watson Engineering Co.
White Eng. Corp., J. G.

Engineers, Consulting, Civil, Elec., Hydraulic, Mech. Val.
Arnold Co.
Austin Co., The
Battey, Paul L.
Bibbons, Rowland J.
Fowler, Chas. Evans
Hunt & Co., Robert W.
Muhlfeld, John E.
Smith & Co., C. E.

Engineers, Contracting.
Arnold Co.
Austin Co., The
Fowler, Geo. L.
Hunt & Co., Robert W.
Muhlfeld, John E.
McLellan & Junkersfeld, Inc.
Smith & Co., C. E.
Stone & Webster
White Eng. Corp., J. G.

Engineers, Inspecting.
Arnold Co.
Austin Co., The
Fowler, Geo. L.
Gulick, Henderson Co.
Hunt & Co., Robert W.
Muhlfeld, John E.
Pittsburgh Testing Laboratory.
Smith & Co., C. E.

Engines, Crude Oil Fuel.
Ingersoll-Rand Co.
Worthington Pump & Machinery Corp.

Engines, Gas and Gasoline.
Fairmont Railway Motors, Inc.
Ingersoll-Rand Co.
Sturtevant Co., B. F.
Worthington Pump & Mchy. Corp.

Engines, Hoisting.
American Hoist & Derrick Co.
Brown Hoisting Mchy. Co.
Industrial Works
McMyler Interstate Co.
Orton & Steinbrenner Co.

Expanders, Tube.
Ryerson & Son, Joseph T.

Fans, Exhaust and Ventilating.
Mudge & Co.
Sturtevant Co., B. F.

Fasteners, Car Door.
Arnold Co.
Fort Pitt Malleable Iron Co.
Miner, W. H.

Fencing, Wire—(See Wire Fence).

Ferro Molybdenum.
Vanadium Corp. of America.

Ferro Tungsten.
Vanadium Corp. of America.

Ferro Vanadium.
Vanadium Corp. of America.

Filters, Water.
Giessel Co., Henry.

Filters, Water and Industrial.
American Water Softener Co.

Filtration Plants (Water).
American Water Softener Co.

Fireboxes.
American Locomotive Co.
Baldwin Locomotive Works
Locomotive Firebox Co.

Fittings, Air Brake.
National Malleable Castings Co.
Westinghouse Air Brake Co.

Fixtures, Car Door.
Miner, W. H.

Flangers, Snow.
Q & C Co., The

Flooring.
Central Coal & Coke Co.
Exchange Sawmills Sales Co.
Jennison Wright Co.
Long-Bell Lumber Co., The

Flooring Composition.
American Mason Safety Tread Co.
Tuco Products Co.

Flue Cleaners—(See Cleaners, Flue).

Flue Cutters—(See Cutters, Flue).

Flue Welders.
Southwark Fdy. & Machine Co.

Flues, Boiler—(See Tubes, Boiler).

Forges, Oil Rivet Heating.
Ferguson Furnace Co.

Forges, Rivet Heating.
Ryerson & Son, Joseph T.

Forgings.
American Steel Foundries
Edgewater Steel Co.
Illinois Steel Co.
Johnson & Co., J. R.
McMyler Interstate Co.
Newport News Shipbuilding & Dry Dock Co.
Steel Car Forge Co.
Tacony Steel Co.

Forgings, Drop.
Steel Car Forge Co.

Foundations.
Fowler, Chas. Evans
Smith & Co., C. E.

Frames, Locomotive.
American Locomotive Co.
American Steel Foundries
Baldwin Locomotive Works
Union Steel Casting Co.

Frames, Motor Car.
Fairmont Railway Motors, Inc.

Frames, Truck.
American Locomotive Co.
American Steel Foundries
Baldwin Locomotive Works
Commonwealth Steel Co.
Franklin Railway Supply Co.

Frames, Vanadium.
American Locomotive Co.
Baldwin Locomotive Works
Union Steel Casting Co.

Frogs and Crossings.
Foster, L. B., Co.
Ramapo Ajax Corp.

Fulcrums, Brake Beam.
American Steel Foundries.
Chicago Ry. Equipment Co.

Furnaces, Rivet Heating—(See Forges, Rivet Heating).

Gage Testers—(See Testers, Gage).

Gages, Steam.
Ashton Valve Co.

Gages Wheel Press, Recording.
Ashton Valve Co.

Gates, Tail.
Morton Mfg. Co.

Gear Blanks, Rolled Steel.
Standard Steel Works.

Gears and Pinions.
American Steel Foundries

Gears, Valve — (See Valve Gears).

Generators, Acetylene.
Air Reduction Sales Co.

Generators, Car Lighting.
Safety Car Lighting & Heating Co.

Glass, Wire.
Mississippi Wire Glass Co.

Goggles.
Air Reduction Sales Co.

Graphite, Lubricating.
Galena Signal Oil Co.

Grapples, Wood.
Industrial Works.

Grate Shakers, Automatic.
Franklin Railway Supply Co.

Grating, Steel.
Irving Iron Works.

Grease Forming Machine.
Franklin Railway Supply Co.

Grinding Machines, Portable.
Ingersoll-Rand Co.

Guard Rail, One Piece.
Ramapo Ajax Corp.

Guards, Dust.
Symington Co., T. H.

Hammers, Pneumatic.
Ingersoll-Rand Co.
Oldham & Son Co., Geo.

Hammers, Riveting.
Ingersoll-Rand Co.

Hammers, Steam.
Industrial Works.
Morgan Engineering Co.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Hand Brakes—(See Brakes, Hand).

Hangers, Car Door—(See Fixtures, Car Door).
Ryerson & Son, Joseph T.

BUYERS INDEX

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

Heaters, Electric.
Gold Car Htg. & Ltg. Co.

Heaters, Feed Water.
Superheater Co., The.
Worthington Pump & Mchy. Co.

Heating Systems, Car (Electric and Steam).
Gold Car Htg. & Ltg. Co.
Safety Car Heating & Lighting Co.
Vapor Car Heating Co., Inc.
Wine Ry. Appliance Co.

Heating and Ventilating Apparatus.
Gold Car Htg. & Ltg. Co.
Sturtevant Co., B. F.
Vapor Car Heating Co., Inc.

Hoisting Machinery.
Brown Hoisting Mchy. Co.
Industrial Works.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Hoists, Air.
Ingersoll-Rand Co.

Hoists, Chain.
Ryerson & Son, Joseph T.

Hoists, Electric.
American Hoist & Derrick Co.
Brown Hoisting Machy. Co.

Hoists, Locomotive.
McMyler Interstate Co.

Hoists, Pneumatic.
Ingersoll-Rand Co.

Holders, Angle Cock.
Mudge & Co.

Hoppers, Wet and Dry (Car).
Duner Co.

Hose, Air, Steam, Etc.
Ingersoll-Rand Co.
Oldham & Son Co., Geo.
Westinghouse Air Brake Co.

Injectors, Exhaust Steam.
Superheater Co., The.

Ingots.
Edgewater Steel Co.
Illinois Steel Co.
McConway & Torley Co.

Inspection of Material and Equipment — (See Engineers, Inspection).

Insulation, Car.
Lehon Co., The
Union Asbestos & Rubber Co.

Insulation, Electrical.
Johns-Manville, Inc.

Insulation, Heat.
Johns-Manville, Inc.
Miner, W. H.

Iron Chain.
Falls Hollow Staybolt Co.

Iron, Charcoal.
Falls Hollow Staybolt Co.
Parkesburg Iron Co.

Iron, Hollow Staybolt.
Falls Hollow Staybolt Co.

Iron, Pig.
Illinois Steel Co.

Iron, Refined.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Iron Staybolt—(See also Staybolts).
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Jacks, Smoke.
Dickinson, Inc., Paul.
Johns-Manville, Inc.

Joints, Air Reservoir.
Barco Mfg. Co.

Joints, Blow Off Line (Roundhouse).
Barco Mfg. Co.
Franklin Ry. Supply Co.

Joints, Coach and Coach Yard.
Barco Mfg. Co.
Franklin Ry. Supply Co.

Joints, Flexible.
Barco Mfg. Co.
Franklin Ry. Supply Co.

Joints, Rail.
American Steel Foundries.
Illinois Steel Co.
Q & C Co., The
Rail Joint Co., The

Joints, Steam, Air and Liquid.
Barco Mfg. Co.
Franklin Ry. Supply Co.

Journal Boxes and Lids.
Allegheny Steel Co.
American Steel Foundries.
Hunt-Spiller Mfg. Corp.
National Malleable Castings Co.
Symington Co., T. H.
Union Spring & Mfg. Co.

Journal Box Wedges — (See Wedges, Journal Box).

Keys, Brake Shoe.
Steel Car Forge Co.

Laboratories, Testing.
Hunt & Co., Robert W. Pittsburgh Testing Laboratory.

Ladders, Steel Car.
Wine Railway Appliance Co.

Lathes, Axle.
Niles-Bement-Pond Co.

Lathes, Engine.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Lathes, Vertical Turret.
Niles-Bement-Pond Co.

Lathes, Wheel.
Niles-Bement-Pond Co.

Lighting Equipment, Car.
Safety Car Ltg. & Htg. Co.

Locomotive Repair Parts.
American Locomotive Co.
Baldwin Locomotive Works, The.
Lima Locomotive Works.
Morgan Engineering Co.

Locomotives, Contractors'.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Locomotives, Electric.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.

Locomotives, Gasoline.
Baldwin Locomotive Works.

Locomotives, Geared.
Lima Locomotive Works.

Locomotives, Industrial.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.
Lima Locomotive Works.

Locomotives, Mine.
American Locomotive Co.
Baldwin Locomotive Works.
General Electric Co.

Locomotives, Rebuilt.
American Locomotive Co.
Newport News Shipbuilding & Dry Dock Co.

Locomotives, Second-Hand.
Zelnicker Supply Co., Walter A.

Locomotives, Steam.
American Locomotive Co.
Baldwin Locomotive Works.
Lima Locomotive Works.

Lubricants (Oil and Grease).
Galena Signal Oil Co.
Mohawk Lubricating Co.
Texas Co.

Lubricators, Driving Box.
Franklin Railway Supply Co.

Lumber.
Central Coal & Coke Co.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.
Long-Bell Lumber Co.

Lumber, Creosoted.
American Creosoting Co.
Central Coal & Coke Co.
Great Southern Lumber Co.
International Creosoting & Construction Co.

Magnets, Lifting.
Industrial Works.
Browning Co.

Mechanical Draft Apparatus—(See Heating and Vent. App.)

Milling Machines, Plain and Universal.
Ryerson & Son, Joseph T.

Molybdenum Metal.
Vandium Corp. of America.

Mouldings, Steel Drawn.
Morton Mfg. Co.

Nails.
American Steel & Wire Co.

Nozzles, Exhaust.
Franklin Railway Supply Co

Nuts—(See Bolts and Nuts).

Nut Locks.
American Bolt Corp., The (Boss Nut Div.).
Grip Nut Co.

Oil Cups.
Prime Mfg. Co.
U. S. Metallic Packing Co.

Oil Filtering and Storage System.
American Water Softener Co.

Oil, Fuel.
Texas Co.

Oils, Lubricating.
Galena Signal Oil Co.
Texas Co.

Oil Plugs, Steam Chest.
Franklin Railway Supply Co.

Oxygen.
Air Reduction Sales Co.

Packing, Air.
Union Asbestos & Rubber Co.

Packing, Cylinder and Valve Ring.
Hunt-Spiller Mfg. Corp.

Packing, Loco. Cab Cock.
Union Asbestos & Rubber Co.

Packing, Locomotive.
Union Asbestos & Rubber Co.

Packing, Ring.
Union Asbestos & Rubber Co.

Packing, Metallic.
U. S. Metallic Packing Co.

Packing, Sheet.
Union Asbestos & Rubber Co.

Packing, Throttle.
Union Asbestos & Rubber Co.

Paint.
Lehon Co., The.
Lucas Co., Robt. M.

Paper Sheathing.
Chicago-Cleveland Car Roofing Co.
Lehon Co., The.

Pavement Breakers.
Ingersoll-Rand Co.

Pile Drivers.
Browning Co.
Industrial Works.
McMyler Interstate Co.
Orton & Steinbrenner Co.

Piling, Creosoted Wood.
International Creosoting & Construction Co.
Jennison-Wright Co.

Piling, Wood.
American Creosoting Co.

Pins, Air Brake and Clevis.
Champion Rivet Co.
Steel Car Forge Co.

Pins, Center.
Miner, W. H.

Pins, Coupler Knuckle.
Champion Rivet Co.
McConway & Torley Co.
Steel Car Forge Co.

Pins, Crank.
American Locomotive Co.
Baldwin Locomotive Works.
Johnson & Co., J. R.

Pipe Coverings.
Union Asbestos & Rubber Co.

Pipe Fittings—(See Fittings, Pipe).

Pipe, Metal Culvert.
American Rolling Mill Co., The.
American Sheet & Tin Plate Co.

Planers.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Plates, Boiler, Firebox—(See Steel Firebox).

Plates, Center—(See Bearings, Center).

Plates, Follower.
Steel Car Forge Co.

Plates, Iron and Steel.
Illinois Steel Co.
Ryerson & Son, Joseph T.

Plates, Tie.
Illinois Steel Co.

Plates, Tin and Terne.
American Sheet & Tin Plate Co.

Platforms, Car.
Irving Iron Works.
Standard Coupler Co.

Plows, Snow.
American Locomotive Co.
Q & C Co., The

Plush, Mohair.
Mass. Mohair Plush Co.

Pneumatic Tools.
Ingersoll-Rand Co.
Oldham & Son Co., Geo.

Poles, Creosoted.
American Creosoting Co.
International Creosoting & Construction Co.
Long-Bell Lumber Co., The

Poles, Telephone and Telegraph.
Central Coal & Coke Co.

Posts, Steel Fence.
American Steel & Wire Co.
Q & C Co., The

Powder Blasting — (See Explosives).

Power Plants.
McLellan & Junkersfeld, Inc.
Muhlfeld, John E.
Stone & Webster.
White Eng. Corp., J. G.

Powdered Coal Equipment.
Muhlfeld, John E.

Preservatives, Wood.
Jennison Wright Co.

Pressed Steel Repair Parts.
Newport News Shipbuilding & Dry Dock Co.

Pulverizers, Coal—(See Crushers, Coal).

Pumps and Pumping Machinery.
Ingersoll-Rand Co.
Worthington Pump & Mchy. Corp.

Pumps, Vacuum.
Ingersoll-Rand Co.

Punching and Shearing Machines.
Ryerson & Son, Joseph T.

Pushers, Locomotive Coal.
Locomotive Stoker Co.

Rail Anchors.
P. & M. Co., The.

Rail Benders.
Q & C Co., The

Rail-Bonds.
American Steel & Wire Co.
Niles-Bement-Pond Co.

Rail Braces — (See Braces, Rail).

Rail, Manganese.
Manganese Steel Rail Co.

Rails.
Illinois Steel Co.

Rails, New.
Foster, L. B., Co.

Rails, Relaying.
Zelnicker Supply Co., Walter A.

Rail Splice Plates — (See Joints, Rail).

Rattan
Hale-Kilburn Co.
Heywood-Wakefield Co.

Refrigerators.
Wine Railway Appliance Co.

Regulators, Gas Pressure.
Air Reduction Sales Co.

Repair Parts.
Baldwin Locomotive Works.

Replacers, Car.
Q & C Co., The

Reverse Gears, Power.
Barco Mfg. Co.
Franklin Railway Supply Co.

Ringers, Bell.
U. S. Metallic Packing Co.

Rivet Cutters.
Ingersoll-Rand Co.

Riveting Machines.
Ingersoll-Rand Co.

Riveting Machines, Portable —(See also Hammers, Pneumatic).
Ingersoll-Rand Co.

Rivets.
American Bolt Corp. (Boss Nut Div.).
Champion Rivet Co.
Ryerson & Son, Joseph T.

Roller Bearings—(See Bearings, Roller).

Roofing, Building.
Lehon Co., The.

For location of advertisements of manufacturers listed in the Buyers Index, see Alphabetical Index on the last page next to cover

BUYERS INDEX

Roofing, Car.
American Sheet & Tin Plate Co.
Chicago-Cleveland Car Roofing Co.
Hutchins Car Roofing Co.
Lehon Co., The
Standard Railway Equipment Co.

Roofing, Corrugated.
American Sheet & Tin Plate Co.

Roofing, for Buildings.
Texas Co.

Roofing, Tin.
American Sheet & Tin Plate Co.

Roofing, Wood.
Exchange Sawmills Sales Co.

Rope, Wire—(See Wire Rope).

Running Boards, Car.
Standard Ry. Equipment Co.

Railroad Structures—(See Engineers and Contractors; also Buildings).

Saddles, Running Board.
Miner, W. H.

Sand Drying Plants.
Roberts & Schaefer Co.

Sand Rammers.
Oldham & Son Co., Geo.

Sanders, Locomotive.
U. S. Metallic Packing Co.

Sash Balances.
Edwards Co., O. M.

Saws, High Speed Friction.
Ryerson & Son, Joseph T.

Saws, Portable, Rail.
Industrial Works.

Screws, Lag.
American Bolt Corp. (Boss Nut Div.).

Seats, Car.
Brill Co., J. G.
Hale-Kilburn Co.
Heywood-Wakefield Co.

Shafting.
Falls Hollow Staybolt Co.
Johnson & Co., J. R.
Ryerson & Son, Joseph T.

Shapers.
Niles-Bement-Pond Co.
Ryerson & Son, Joseph T.

Shapes, Pressed Steel.
Greenville Steel Car Co.

Shapes, Structural.
Illinois Steel Co.
Ryerson & Son, Joseph T.

Sheds, Train.
Arnold Co.
Austin Co., The

Sheets, Black and Galvanized.
American Rolling Mill Co., The.
American Sheet & Tin Plate Co.
Ryerson & Son, Joseph T.

Sheets, Corrugated.
American Rolling Mill Co., The.
American Sheet & Tin Plate Co.

Sheets, Electrical.
American Rolling Mill Co., The.
American Sheet & Tin Plate Co.

Sheets, Locomotive Jacket.
American Rolling Mill Co., The.
American Sheet & Tin Plate Co.

Sheets, Polished or Planished Iron.
American Sheet & Tin Plate Co.

Sheets, Steel.
American Rolling Mill Co., The.
Ryerson & Son, Joseph T.

Shops, Railroad (See Buildings, Iron, Steel and Steel Concrete).

Shovels, Steam.
Browning Co.

Siding, Corrugated and Plain.
American Rolling Mill Co., The.
American Sheet & Tin Plate Co.

Signals, Automatic Cab.
Miller Train Control Corp.

Signals, Railway.
Miller Train Control Corp.

Spikes.
American Steel & Wire Co.
Foster, L. B., Co.
Illinois Steel Co.

Splice Bars, Angle.
Illinois Steel Co.

Splice Bars, Rail.
Foster, L. B., Co.

Spring Plates or Seats.
Allegheny Steel Co.

Springs.
American Steel Foundries.
American Steel & Wire Co.
Fort Pitt Spring & Mfg. Co.
Pittsburgh Spring & Steel Co.
Railway Steel Spring Co.
Standard Steel Works.
Union Spring & Mfg. Co.
U. S. Metallic Packing Co.

Springs, Machinery for Repairing.
Ryerson & Son, Joseph T.

Springs, Vanadium.
Pittsburgh Spring & Steel Co.

Staybolts.
American Locomotive Co.
Falls Hollow Staybolt Co.
Flannery Bolt Co.
Ryerson & Son, Joseph T.

Staybolts, Hollow.
Falls Hollow Staybolt Co.
Ryerson & Son, Joseph T.

Steam Chests.
Franklin Railway Supply Co.

Steam Shovels.
Orton & Steinbrenner Co.

Steel, Alloy.
Central Steel Co.

Steel, Firebox.
Illinois Steel Co.
Lukens Steel Co.

Steel, Pressed Specialties.
Hale-Kilburn Co.

Steel, Structural.
Illinois Steel Co.
Ryerson & Son, Joseph T.

Steel, Tool.
Illinois Steel Co.
Ryerson & Son, Joseph T.

Stokers, Locomotive.
Elvin Mechanical Stoker Co.
Locomotive Stoker Co.
Standard Stoker Co.

Stop Casings, Metal.
Edwards Co., O. M.

Stringers, Bridge.
Central Coal & Coke Co.
Long-Bell Lumber Co.

Superheaters.
Babcock & Wilcox.
Superheater Co., The.

Switches, Electric.
McMyler Interstate Co.

Switches and Switch Stands.
Foster, L. B., Co.
Ramapo Ajax Corp.

Syphons, Locomotive.
Locomotive Firebox Co.

Tanks, Air, Gas and Oil.
American Locomotive Co.
Babcock & Wilcox Co.
Westinghouse Air Brake Co.

Tanks, Water.
American Locomotive Co.
Babcock & Wilcox Co.

Taps, Staybolt.
Ryerson & Son, Joseph T.

Terminals, Freight.
Austin Co., The

Terminals, Railroad.
McClellan & Junkersfeld, Inc.
Robinson Co., Dwight P.

Testers, Gage.
Ashton Valve Co.

Tie Tamping Outfits.
Ingersoll-Rand Co.

Ties, Creosoted.
Great Southern Lumber Co.
International Creosoting & Construction Co.
Jennison-Wright Co.

Ties, Wood.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.

Timber, Railway.
American Creosoting Co.
Central Coal & Coke Co.
Exchange Sawmills Sales Co.
Great Southern Lumber Co.
International Creosoting & Construction Co.
Long-Bell Lumber Co., The

Tires, Steel.
Edgewater Steel Co.
Railway Steel Spring Co.
Standard Steel Works.

Torches, Welding and Cutting.
Air Reduction Sales Co.

Tractors, Industrial.
Elwell Parker Electric Co.

Tractors, Turntable.
Nichols & Bros., Geo. P.

Train Control Systems.
Miller Train Control Corp.

Tramways (Wire Rope).
American Steel & Wire Co.

Transfer Tables.
Brown Hoisting Mchy. Co.
Industrial Works.
Nichols & Bros., Geo. P.

Transmission Towers.
Brown Hoisting Mchy. Co.

Trap Doors and Fixtures.
Edwards Co., O. M.
Tuco Products Co.

Treads, Safety.
American Mason Safety Tread Co.
Morton Mfg. Co.

Treatment, Water—(See Water Softening and Purifying).

Truck Frames—(See Frames Truck).

Trucks, Car and Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Boyden Steel Corp.
Commonwealth Steel Co.
Franklin Railway Supply Co.
Standard Car Truck Co.

Trucks, Electric Storage Battery.
Elwell Parker Electric Co.

Trucks, Industrial.
Elwell Parker Electric Co.

Tubes, Arch.
Parkesburg Iron Co.

Tubes, Boiler.
Allegheny Steel Co.
Detroit Seamless Steel Tubes Co.
Globe Steel Tubes Co.
Parkesburg Iron Co.
Ryerson & Son, Joseph T.

Tubes, Stay.
Falls Hollow Staybolt Co.

Tubing, Seamless Steel.
Detroit Seamless Steel Tubes Co.
Globe Steel Tubes Co.

Tungsten Metal.
Vanadium Corp. of America.

Turntable Tractors.
Nichols & Bros., Geo. P.

Turntables.
Foster, L. B., Co.
Industrial Works.
McMyler Interstate Co.

Uncoupling Device.
Hutchins Car Roofing Co.

Underframes, Steel.
Commonwealth Steel Co.
Greenville Steel Car Co.
Ralston Steel Car Co.

Upholstery, Car.
Mass. Mohair Plush Co.

Valves, Drifting.
Franklin Railway Supply Co.

Valves, Piston.
Franklin Railway Supply Co.

Valves, Pop, Safety and Relief.
Ashton Valve Co.
Westinghouse Air Brake Co.

Ventilators, Car.
Gold Car Htg. & Ltg. Co.
Mudge & Co.
Vapor Car Heating Co., Inc.
Wine Railway Appliance Co.

Ventilators, Shop and Roundhouse.
Dickinson, Inc., Paul.
Johns-Manville, Inc.

Washers.
Wine Railway Appliance Co.

Water Columns—(See Columns, Water).

Water Coolers.
Giessel Co., Henry.

Water Cooling Equipment.
Giessel Co., Henry.

Waterproofing Materials.
Lehon Co., The.

Water Purifying Materials and Compounds.
Bird-Archer Co., The
Dearborn Chemical Co.

Water Softening and Purifying.
American Water Softener Co
Bird-Archer Co., The
Dearborn Chemical Co.

Weather Stripping.
Tuco Products Co.

Wedges, Automatic.
Franklin Railway Supply Co.

Wedges, Journal Box.
American Steel Foundries.
Steel Car Forge Co.

Welding Machines, Electric.
General Electric Co.

Welding Machines, Flue.
Ryerson & Son, Joseph T.

Welding and Cutting Apparatus—(See Cutting and Welding Apparatus).

Welding Rods and Wire.
Air Reduction Sales Co.

Weather Stripping.
Edwards Co., O. M.
Tuco Products Co.

Wheel Centers, Driving.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Commonwealth Steel Co.
Edgewater Steel Co.
Hunt-Spiller Mfg. Corp.
Standard Steel Works.
Union Steel Casting Co.

Wheels, Car and Locomotive.
American Locomotive Co.
American Steel Foundries.
Baldwin Locomotive Works.
Edgewater Steel Co.
Illinois Steel Co.
Railway Steel Spring Co.
Standard Steel Works.

Wheels, Hand Push and Motor Car.
Fairmont Railway Motors, Inc.

Wheels, Mine Car.
Edgewater Steel Co.

Wheels, Pressed Steel Motor Car.
Mudge & Co.

Wheels, Steel and Steel Tired.
Edgewater Steel Co.
Illinois Steel Co.
Lima Locomotive Works.

Whistles, Locomotive.
Ashton Valve Co.
Westinghouse Air Brake Co.

Window Fixtures.
Edwards Co., O. M.

Windows, Weatherproofing.
Morton Mfg. Co.

Wire.
American Steel & Wire Co.
Kerite Insulated Wire & Cable.

Wire, Barb.
American Steel & Wire Co.

Wire, Fence.
American Steel & Wire Co.

Wire, Insulated.
American Steel & Wire Co.
Kerite Insulated Wire & Cable.

Wire, Rail Bond—(See Rail Bonds).

Wire, Rope.
American Steel & Wire Co.

Wire, Telephone & Telegraph.
American Steel & Wire Co.

Wood, Creosoted.
Jennison-Wright Co.

Wood Preservative—(See Preservative, Wood).

Wrecking Cranes—(See Cranes, Wrecking).

Wrenches.
Coes Wrench Co.

ALPHABETICAL INDEX TO ADVERTISEMENTS

A

Air Reduction Sales Co..... 55a
Allegheny Steel Co..... 58
American Arch Co., Inc..... 1
American Bolt Corp. (Boss Nut Division) 58
American Brake Shoe & Foundry Co. 56
American Creosoting Co., Inc.. 57
American Hoist & Derrick Co.. 48
American Locomotive Co., The. 29
American Mason Safety Tread Co. 56
American Rolling Mills Co., The 6
American Sheet & Tin Plate Co. 56
American Steel Foundries..... 20
American Steel & Wire Co.... 55
American Water Softener Co.. 59
Arnold Co., The..... 60
Ashton Valve Co., The..... 58
Austin Company, The..... 17

B

Babcock & Wilcox Co., The... 56
Baldwin Locomotive Works, The 31
Barco Mfg. Co..... 30
Basford Co., G. M..... 25
Battey & Kipp, Inc..... 60
Bibbins, Roland J..... 60
Bird-Archer Co., The..... 53
Boyden Steel Corp..... 59
Brill Co., J. G..... 8
Brown Hoisting Machinery Co. 69
Buyers' Index.....62, 63, 64, 65

C

Carnegie Steel Co..... 58
Central Coal & Coke Co..... 10
Central Steel Co., The..... 45
Champion Rivet Co., The..... 59
Chicago-Cleveland Car Roofing Co. 14
Chicago Railway Equipment Co., 57, 70
Clark Car Co..... 58
Classified Advertisements 61
Colonial Creosoting Co., Inc.. 57
Commonwealth Steel Co..... 47
Consolidated Purchasing Agency 61

D

Davis Brake Beam Co..... 59
Dearborn Chemical Co..... 55
Detroit Seamless Steel Tubes Co. 59
Dickinson, Inc., Paul..... 57
Duner Co. 57

E

Edgewater Steel Co..... 59
Edwards Co., Inc., O. M., The 60
Elvin Mechanical Stoker Co., The 28
Elwell-Parker Electric Co., The 58
Exchange Sawmills Sales Co., The 59

F

Fairmont Railway Motors, Inc. 59
Falls Hollow Staybolt Co..... 56
Flannery Bolt Co..... 36
Fort Pitt Malleable Iron Co... 57
Fort Pitt Spring & Mfg. Co... 57
Foster Co., Inc., L. B..... 61
Fowler, Charles Evan..... 60
Franklin Railway Supply Co., Inc. 26

G

Galena-Signal Oil Co..... 7
General Electric Co..... 22
Georgia Creosoting Co., Inc.... 57
Get Together Department..... 61
Giessel & Co., Henry..... 58
Globe Steel Tubes Co..... 54
Gold Car Htg. & Ltg. Co..... 58
Great Southern Lumber Co.... 48
Greenville Steel Car Co..... 55b
Grip Nut Co..... 4
Gulick-Henderson Co. 60

H

Hale-Kilburn Co. 57
Hall Draft Gear Corp..... 52
Hayward Co., The..... 56
Heywood-Wakefield Co. 59
Hunt & Co., Robert W..... 60
Hunt-Spiller Mfg. Corp..... 40
Hutchins Car Roofing Co..... 24

I

Illinois Steel Co..... 19
Industrial Works 54
Ingersoll-Rand Co. 54
International Creosoting & Construction Co. 11
Irving Iron Works..... 52

J

Jennison-Wright Co., The..... 57
Johns-Manville, Inc. 49
Johnson & Co., J. R..... 55b

K

Kerite Insulated Wire & Cable Co., The 55
Kleinhans Co., H..... 61

L

Lehon Co., The..... 57
Lima Locomotive Works..... 27
Locomotive Firebox Co..... 41
Locomotive Stoker Co..... 32
Long-Bell Lumber Co., The... 12
Lucas Co., Robert M..... 59
Lukens Steel Co..... 51

M

Magnus Co. 55
Manganese Steel Rail Co..... 58
Massachusetts Mohair Plush Co. 57
McClellan & Junkersfeld, Inc.. 60
McConway & Torley Co., The.. 52
McMyler Interstate Co., The.. 13
Miller Train Control Corp..... 9
Miner, W. H..... 3
Mississippi Wire Glass Co..... 56
Morgan Engineering Co., The.. 39
Morton Mfg. Co..... 58
Mudge & Co..... 58
Muhlfeld, John E..... 60

N

National Malleable Castings Co. 2
Newport News Shipbuilding & Dry Dock Co..... 57
Nichols & Bros., George P..... 59
Niles-Bement-Pond Co..... 59

O

Ohio Locomotive Crane Co.... 55a
Oldham & Son Co., Geo..... 51
Orton & Steinbrenner Co..... 55a

P

P. & M. Co., The..... 53
Parkesburg Iron Co., The..... 37
Pennsylvania Car Co..... 53
Pittsburgh Spring & Steel Co.. 60
Pittsburgh Testing Laboratory. 55a
Porter Co., H. K..... 58
Professional Directory..... 60
Pullman Co., The..... 18

Q

Q. & C. Co., The..... 54

R

Rail Joint Co., The..... 54
Railway Materials Co..... 56
Railway Steel Spring Co..... 42
Ralston Steel Car Co., The.... 47
Ramapo Ajax Corp..... 58
Republic Railway Equipment Co 56
Roberts & Schaefer Co..... 60
Robinson Co., Inc., Dwight P.. 60
Ryerson & Son, Joseph T..... 59

S

Safety Car Htg. & Ltg. Co., The 55b
Schaefer Equipment Co..... 57
Smith & Co., C. E..... 60
Southern Iron & Equip. Co.... 60
Standard Car Truck Co..... 55a
Standard Coupler Co..... 57
Standard Rail & Steel Co..... 61
Standard Steel Works..... 23
Standard Stoker Co., Inc..... 46
Steel Car Forge Co..... 59
Stone & Webster, Inc..... 60
Sturtevant Co., B. F., The.... 49
Superheater Co., The..... 59
Symington Co., T. H., The.... 15

T

Tacony Steel Co..... 43
Texas Co., The..... 16
Tuco Products Corp..... 58

U

Union Asbestos & Rubber Co.. 59
Union Draft Gear Co..... 57
Union Metal Products Co..... 21
Union Spring & Mfg. Co..... 55b
Union Steel Casting Co..... 53
U. S. Metallic Packing Co., The 44

V

Vanadium Corp. of America... 38
Vapor Car Heating Co., Inc., The 56

W

Western Wheeled Scraper Co... 55a
Westinghouse Air Brake Co.... 33
Wine Railway Appliance Co., The 58
Woods & Co., Edwin S..... 58
Worthington Pump & Machinery Corp. 34, 35

Z

Zelnicker Supply Co., Walter A. 61

"The Cost of Reloading Stored Coal Is a Very Small Item"

This extract from a letter written by the Thurmond Coal Company, will interest coal mine and industrial executives who are studying the economies of storing coal.

"We have used our Brownhoist locomotive crane practically every day for two years for the storing and loading of coal and for the handling of heavy members incidental to our mining.

The Brownhoist has proved exceptionally beneficial to us during periods of restricted car supply, enabling us to operate and store coal on days when other mines in the field, not provided with cars, were idle. For this work the crane has been of inestimable value to us.

We have found that the cost of reloading stored coal is a very small item and as compared with our inability to operate without the crane, it is practically negligible."

The Brown Hoisting Machinery Co., *Cleveland, O.*

Branch Offices: New York, Chicago, Pittsburgh, San Francisco, New Orleans

BROWNHOIST

MATERIAL HANDLING MACHINERY

THE CHICAGO RAILWAY EQUIPMENT COMPANY extends to its Friends Sincere Good Wishes for the Coming Year